Dermatology:

1. Which of the following is the most common location of keloid formation?
   - A. Abdomen
   - B. Lower back
   - C. Sternum
   - D. Arms
   - E. Legs

Ans: Sternum

Explanation: A keloid is an abnormal proliferation of scar tissue that forms at the site of cutaneous injury. It remains confined to the original site of injury. The most common site of keloid is sternum. Other common sites are shoulders, neck, extensor surfaces of trunk and limbs.

2. Which of the following conditions has the strongest association with erythema multiform?
   - A. Crohn's disease
   - B. Ulcerative colitis
   - C. Tuberculosis
   - D. Sarcoidosis
   - E. Herpes simplex

Ans: Herpes simplex

Explanation: Erythema multiform presents in the form of target lesions initially on the back of hands or feet and spread later to torso. Mild pruritus is present. Common causes are viruses specifically HAEM (herpes associated erythema multiform) and orf. Other causes are mycoplasma, streptococcus, penicillin V, sulphonamides, allopurinol, NSAIDs, OCPs, SLE, sarcoidosis, leukemia and lymphoma.

3. A young male presented with pruritic skin lesions on buttocks and extensor surfaces of knees and elbows. He also complains of altered bowel habits on and off. What is the most probable diagnosis?
   - A. Psoriasis
   - B. Lichen planus
   - C. Henoch Schonlein purpura
   - D. Dermatitis herpetiformis
   - E. Leukocytoclastic vasculitis

Ans: Dermatitis herpetiformis

Explanation: Dermatitis herpetiformis presents as itchy vesicular lesions on extensor surfaces like elbows, knees and buttocks. It is an autoimmune disorder associated with Celiac disease. Psoriasis presents with erythematous scaly plaques. Lichen planus are violaceous polygonal papules. HSP and leukocytoclastic vasculitis present as petechial lesions.

Dermatitis herpetiformis (DH) is an inflammatory cutaneous disease with a chronic relapsing course, pruritic polymorphic lesions, and typical histopathological and immunopathological findings. DH is considered the specific cutaneous manifestation of celiac disease (CD). DH usually presents with symmetrical, grouped polymorphic lesions consisting of erythema, urticarial plaques, and papules,

involving the extensor surfaces of the knees, elbows, shoulders, buttocks, sacral region, neck, face, and scalp. By contrast, herpetiform vesicles, which reflect the name of the disease, may occur later or are often immediately excoriated, resulting in erosions, crusted papules, or areas of post inflammatory dyschromia, and are usually not seen in the patients. Itching of variable intensity and scratching and burning sensation immediately preceding the development of lesions are common. In case of typical findings from skin biopsy DIF (i.e, granular IgA deposits at the dermal–epidermal junction or at the papillary tips) and of positive anti-tTG testing, the diagnosis of DH and, accordingly, of CD can be confirmed. Therefore, treatment and monitoring of DH should be managed. Lifelong gluten-free diet is the first-choice treatment of the disease. Gluten-free diet is able to resolve both the gastrointestinal and the cutaneous manifestations, as well as to prevent the development of lymphomas and other diseases associated with gluten-induced enteropathy and malabsorption. It takes an average of 1–2 years of a gluten-free diet for the complete resolution of the cutaneous lesions, which invariably recur within 12 weeks after the reintroduction of gluten. Dapsone is considered a valid therapeutic option for patients with DH during the 6-to 24-month period until the gluten-free diet is effective.

4. Which of the following is the most common form of cutaneous tuberculosis?
   - A. Tuberculosis verrucosa cutis
   - B. Tuberculosis
   - C. Lupus vulgaris
   - D. Erythema nodosum
   - E. Erythema induratum of Bazin

Ans: Lupus vulgaris

Explanation: Lupus vulgaris is the most common form of cutaneous tuberculosis. It presents as papules and well-delimited, reddish-brown plaques in facial and cervical areas, which rarely ulcerate. Scrofuloderma was the most common form before ATT. Other cutaneous manifestations of TB are scrofuloderma, tuberculous chancre, lichen scrofulosorum, and tuberculous gummas.

5. An 18 years old boy presented with a painless ulcer on his fingers for 3 months. Which of the following can be the diagnostic possibility in this patient?
   - A. Orf
   - B. Cowpox
   - C. Primary chancre
   - D. Monkey pox
   - E. Chancroid

Ans: Primary chancre

Explanation: Among all the above conditions, only primary chancre presents as painless ulcer. Rest of the conditions are associated with painful ulcerations.

6. A diagnosed case of RA and primary epilepsy patient presented with excessive hair growth on her trunk, arms and legs. Hypertrichiosis is suspected. What can be the most probable causative agent?
   - A. Prednisone
   - B. Sodium valproate

C. Cyclosporine
D. Cimetidine
E. Methotrexate

Ans: Cyclosporine

Explanation: Hirsutism is the presence of excessive hair in females in androgen dependent areas creating a male pattern hair growth while hypertrichiosis is excessive hair growth in non-androgen dependent areas. Drugs that induce hirsutism by their inherent androgenic effects include:

- DHEAS
- Testosterone
- Danazol
- Anabolic steroids
- High dose steroids
- Diazoxide

Drugs that can cause hypertrichiosis include:

- Phenytoin
- Minoxidil
- Cyclosporine
- Acetazolamide
- Streptomycin

7. A 45 year old female presented with complaints of pruritus all over her body for 1 month specifically at night. On examination, multiple erythematous lesions were present between her fingers. What is the most probable diagnosis?
   A. Urticaria
   B. Scabies
   C. Impetigo
   D. Eczema
   E. Lichen planus

Ans: Scabies

Explanation: Erythematous lesions specifically present between fingers signifies the diagnosis of scabies. Urticaria presents as wheel formation. Impetigo is yellow honey colored crusted lesions. Eczema are weeping itchy lesions. Lichen planus is present more on volar aspects of wrists as violaceous lesions.

8. Which of the following conditions is least associated with pruritus?
   A. Chronic kidney disease
   B. Iron deficiency anemia
   C. Lichen planus
   D. Polycythemia
   E. Pemphigus vulgaris

Ans: Pemphigus vulgaris

Explanation: Pemphigus vulgaris is more of a painful condition with flaccid blisters than itchy lesions which are present in pemphigoid. Rest of the above diseases are associated with pruritus.

9. A 36 years old female presented with symmetrical erythematous lesions with an orange peel texture over both of her shins. What is your probable diagnosis?
   A. Venous eczema
   B. Erythema nodosum
   C. Pyoderma gangrenosum
   D. Pretibial myxedema
   E. Necrobiosis lipoidica

Ans: Pretibial myxedema

Explanation: Pretibial myxedema is a pathognomonic erythematous lesions present in Grave's disease. Erythema nodosum are tender palpable nodules whereas pyoderma gangrenosum are tender ulcers with violaceous edges and rapid progression. Necrobiosis lipoidica usually presents with shiny, asymptomatic patches that slowly enlarge over months to years.

10. A 24 year old male presented with chronic urticaria. He wants to know about the common precipitating agent for this. Which of the following is the most common precipitating agent for urticaria?
    A. Penicillin
    B. Insect bite
    C. Parasites
    D. Food
    E. Chemicals

Ans: Food

Explanation: Food is the most common cause of urticaria worldwide. All others can also cause urticari with less frequency.

11. Which of the following is the safest drug for urticaria in an 8 week pregnant female?
    A. Diphenhydramine
    B. Loratadine
    C. Desloratadine
    D. Cetirizine
    E. Promethazine

Ans: Diphenhydramine

Explanation: Diphenhydramine is the safest anti-histamine that can be used in all trimesters. Rest of drugs are category C drugs.

12. Which of the following is true regarding erysipelas?
    A. Mainly affects abdomen
    B. Highly sensitive to macrolides

C. Cause is exotoxin producing organisms
D. Identical to TEN
E. Mainly caused by S.Aureus

Ans: Cause is exotoxin producing organisms

Explanation: Erysipelas is a bacterial skin infection involving the upper dermis that characteristically extends into the superficial cutaneous lymphatics. It is a tender, intensely erythematous, indurated plaque with a sharply demarcated border. Its well-defined margin can help differentiate it from cellulitis. Erysipelas occurred on the face, but cases today most often involve the legs. The group A streptococcal bacterium streptococcus pyogenes causes most of the facial infections; although it can also cause erysipelas on the legs, an increasing percentage of lower extremity infections are now being caused by non–group A streptococci. Streptococcal toxins are thought to contribute to the brisk inflammation that is typical of this infection. Penicillin administered orally or intramuscularly is sufficient for most cases of classic erysipelas and should be given for 5 days, but if the infection has not improved, treatment duration should be extended.

13. A 35 year old female presented with scaly erythematous plaques on face and trunk for almost 2 years. Her labs showed anemia and neutropenia. She also complains of joint pains and fatigue. What can be the cause in this patient?
    A. Steroid induced myopathy
    B. IgA pemphigus
    C. Systemic lupus erythematous
    D. Pemphigus foliaceous
    E. Pemphigus vulgaris

Ans: Systemic lupus erythematous

- **Explanation:** Scaly erythematous plaques are present in SLE from the above options. Patient also has bicytopenia and arthritis. IgA pemphigus is a blistering disorder. Steroid induced myopathy presents with proximal muscle weakness. Pemphigus foliaceous presents as superficial scaly and crusted blisters. Pemphigus vulgaris is an autoimmune blistering condition and is potentially life-threatening disease with a mortality rate of 5-15%.

Dermatological manifestations of SLE:

- Malar rash
- Photosensitivity
- Discoid rash
- Subacute cutaneous lupus erythematosus
- Lupus profundus or lupus erythematosus panniculitis
- Cutaneous vasculitis
- Urticarial vasculitis
- Livedo reticularis
- Bullous systemic lupus erythematosus

14. A 25 year old female presented with bullous lesions on her trunk and multiple erosions in oral cavity. There is no other significant history and baseline investigations are normal. What can be the diagnosis in this patient?
    A. Paraneoplastic pemphigus
    B. IgA pemphigus
    C. Systemic lupus erythematosus
    D. Pemphigus foliaceous
    E. Dermatitis herpetiformis

Ans: IgA pemphigus

Explanation: While bullous lesions can be present in SLE, but no other significant history and normal investigations ruled out this cause. IgA pemphigus is an immune-mediated condition which presents with cutaneous and oral blisters. Pemphigus foliaceous is characterized by involvement of healthy-appearing skin that blisters when rubbed (Nikolsky sign). Mucosal involvement is not seen in pemphigus foliaceous.

15. Which of the following is a useful test for the diagnosis of contact dermatitis?
    A. Skin patch test
    B. Skin prick test
    C. Latex IgM level
    D. Radio immunosorbent assay
    E. Serum IgE level

Ans: Skin patch test

Explanation: Skin patch test is useful in diagnosing contact dermatitis. 30-40 allergen patches are applied on the back which are removed 48 hours later. Results are read by a dermatologist or immunologist. Skin prick test is used for food allergies. Latex IgM level is used in suspected latex and rubber allergy.

16. Which of the following conditions is associated with hypertrichiosis?
    A. Tinea capitis
    B. Porphyria cutanea tarda
    C. Telogen effluvium
    D. Discoid lupus
    E. Seborrheic dermatitis

Ans: Porphyria cutanea tarda

Explanation: All of the above conditions are associated with alopecia rather than hypertrichiosis except porphyria cutanea tarda. It presents as a photosensitive rash with blisters and fragile skin on face and dorsal aspects of hands. Other features are hypertrichiosis and hyperpigmentation. Urinary porphyrin levels are abnormally high in PCT with several hundreds to thousands micrograms excreted in a 24-hour period. Sunlight avoidance is the main defense for photosensitivity until clinical remission can be induced. Initial treatment is venesection to reduce the level of ferritin below the normal reference range. If venesection is contraindicated, hydroxy chloroquine should be used. PCT related to hepatitis C is treated with antivirals for hepatitis C.

17. Which of the following is the most important prognostic factor in malignant melanoma?

A. Number of lesions
B. Age of patient
C. Diameter of lesion
D. Depth of melanoma
E. Size of lesion

Ans: Depth of melanoma

Explanation: Depth of melanoma is the single most important prognostic factor in a patient with malignant melanoma with a 5-years survival rate of more than 95-100%, if melanoma is less than 1 mm. 5-years survival approaches to less than 50%, if lesion is more than 4 mm deep.

18. A 35 year old HCV positive male presented with an itchy rash on flexor surfaces of his arms. Examination showed violaceous, polygonal and pink lesions. What is the most likely diagnosis?
    A. Morphea
    B. Porphyria cutanea tarda
    C. Lichen planus
    D. Lichen sclerosis
    E. Eczema
    F. Cryoglobulinemic vasculitis

Ans: Lichen planus

Explanation: Lichen planus is commonly associated with hepatitis C infection and presents as violaceous polygonal, papular and pink lesions on palms, soles, genitalia and flexor surfaces of arms. Oral involvement is also seen in 50% of patients. Topical steroids are the mainstay of treatment.

19. A known case of plaque psoriasis with psoriatic arthritis came for your advice as he is taking multiple other medications for different problems. Which of the following medications should be stopped in this patient?
    A. Valproic acid
    B. Lisinopril
    C. Amlodipine
    D. Omeprazole
    E. Aspirin

Ans: Lisinopril

Explanation: Following drugs may exacerbate psoriasis and should be avoided:

- Beta blockers
- Lithium
- Chloroquine and HCQ
- NSAIDs
- ACE inhibitors
- Infliximab
- Oral steroids (Withdrawal)

20. A 25 year old female who is a known case of epilepsy started on lamotrigine 3 days back presented with peeling of skin from her bottom lip and erythematous lesions on her trunk and arms. She also complains of sore throat and mouth ulcers. What is the most likely diagnosis?
    A. Lichen planus
    B. MRSA cellulitis
    C. Steven Johnson syndrome
    D. Impetigo
    E. Erysipelas

Ans: Steven Johnson syndrome

Explanation: The triad of sore throat, erythematous rash and mucosal involvement after lamotrigine treatment initiation is suggestive of Steven Johnson syndrome. Almost all antiepileptics can cause SJS, but lamotrigine is most commonly associated with this specifically when started at high dose initially. This is the reason, lamotrigine is started with low dose and titrated slowly to avoid the risk of SJS.

21. A 23 year old female with 2 year history of ulcerative colitis presented with a deep, red, necrotic ulcer with violaceous borders on left leg which started as a small papule 4 days back. What initial treatment should be given to her?
    A. Flucloxacillin
    B. Dapsone
    C. Oral prednisone
    D. Cyclosporine
    E. Colchicine

Ans: Oral prednisone

Explanation: The history of rapid progression of a small red papule to a deep, red and necrotic ulcer on lower limb with a violaceous border is a classical case of pyoderma gangrenosum. It is commonly associated with IBD. Oral prednisone at 1 mg/kg/day is the initial treatment of choice. Cyclosporine and infliximab are used in resistant cases.

22. A 14 year old girl presented with fever and migratory arthritis for 1 week. Her mother also describes some bizarre, jerky and irregular movements. She had a history of sore throat 2 weeks back. A rash is present in her torso. What does the rash most likely represent?
    A. Erythema multiform
    B. Erythema nodosum
    C. Erythema marginatum
    D. Erythema toxicum
    E. Erythema chronicum migrans

Ans: Erythema marginatum

Explanation: History of sore throat, fever, migratory arthritis, and chorea suggest the diagnosis o rheumatic fever. The typical rash associated with RF is called erythema marginatum. The classical clinica lesion begins as an asymptomatic erythematous macule that spreads peripherally and coalesces to for polycyclic or serpentine patches or plaques. Lesions occur in crops over days to weeks and are evanescent. The rate of migration is 2 to 12 mm over a period of a few hours. The commonest sites are the trunk, axillae, and proximal extremities, usually with the sparing of the face. Lesions tend to last from a few hours to a few weeks and are often more perceptible during the afternoon.

23. Which of the following is the most common skin lesion associated with IBD?
   A. Pyoderma gangrenosum
   B. Sweet syndrome
   C. Erythema nodosum
   D. Pyodermatitis vegetans
   E. Acquired epidermolysis bullosa

Ans: Erythema nodosum

Explanation: Erythema nodosum is the most common cutaneous manifestation of IBD, whereas pyoderma gangrenosum is the most serious and debilitating skin manifestation of IBD. Other cutaneous manifestations of IBD are:

- Subcutaneous nodules or non-healing ulcers in the lower extremities.
- Pseudocondyloma.
- Perianal fissures and fistulas
- Aphthous stomatitis
- Pyostomatitis vegetans
- Angular cheilitis
- Pyodermatitis vegetans
- Sweet's syndrome
- Bowel-associated dermatosis–arthritis syndrome
- Leukocytoclastic vasculitis
- Acquired epidermolysis bullosa.

Diabetes mellitus

1. A 46 year man presents for his annual physical examination. He states that he has been going to the bathroom to pass urine more frequently than normal and has lost approximately 8 kilogram in the past six months without trying. His random glucose today is 258 mg/dl. Which of the following is most appropriate to confirm the diagnosis?
   A. Fasting glucose in morning
   B. Oral glucose tolerance test
   C. Repeat random glucose
   D. Check HBA1C
   E. No other tests needed for diagnosis

>200
6.0-7.0
7.8-11.

Ans: No other tests needed for diagnosis

Explanation: This patient is having classic symptoms of hyperglycemia, which are polyuria, polyphagia, polydipsia and unusual weight loss. The criteria for the diagnosis of diabetes is as follows:

- Fasting glucose > than or equal to 126mg/dl. Fasting is defined as no caloric intake for atleast 8 hours OR
- 2 hour plasma glucose > 200 mg/dl during OGTT. The test is performed by using a glucose load containing the equivalent of 75 gram anhydrous glucose dissolved in water. OR
- HBAIC > 6.5% OR
- In a patient with classic symptoms of hyperglycemia, or hyperglycemic crisis, a random plasma glucose more than 200 mg/dl.

In the absence of unequivocal hyperglycemic symptoms, diagnosis requires two abnormal test results from the same sample or in two separate test samples.

2. A 36 year old female came to you for annual check up. Currently, she weighs 66kg with BMI of 22 kg/m2 and has no other medical conditions. Her mother and father both have T2DM. She has three children and all of them weighed less than 4 kg at birth. She is active otherwise. The most appropriate recommendation for screening for DM is to begin:
   A. [✓ At age 45 then 3 yearly]
   B. At age 45 then yearly
   C. At age 40 then 3 yearly
   D. At age 40 then yearly
   E. Screen today then yearly

3.0-4.
4-4.5

Ans: At age 45 then 3 yearly

Explanation: Screening should be considered in overweight or obese with BMI > 23 kg/m2 in Asians adults who have one or more of the following risk factors:

- First degree relatives with DM
- History of CVD
- Blood pressure > 140/90 or on therapy for hypertension
- HDL < 35 or triglyceride > 250
- Polycystic ovarian syndrome

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Ans: Erythema nodosum

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3.0-4.
4-4.5

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- First degree relatives with DM
- History of CVD
- Blood pressure > 140/90 or on therapy for hypertension
- HDL < 35 or triglyceride > 250
- Polycystic ovarian syndrome

- Physical inactivity
- Acanthosis nigricans
- History of GDM or birth of baby with weight more than 4kg

All other patients should be tested for diabetes at the age of 45, and if normal, testing should be repeated at a minimum of 3 year interval. This patient is only having family history of DM with no other risk factors, so the appropriate option is to screen her at the age of 45.

3. A 46 year old female is recently diagnosed with DM. Labs at the time of diagnosis are RBS 265, HBA1C 8.4%, creatinine 1.1. The weight of patient is 70 kg. Which of the following is the most appropriate recommendation for her?
   - A. Lifestyle changes only
   - B. Metformin only
   - C. Start basal bolus insulin
   - D. Life style change+ metformin
   - E. Lifestyle changes and glipizide

48-

48.
6.5.

6.5
metf
7.5

Ans: Lifestyle change + metformin

Explanation: Guidelines recommend to start metformin along with dietary and lifestyle modifications in all patients with new diagnosis of T2DM.

4. Which of the following is the characteristics feature of maturity onset diabetes of young (MODY)?
   - A. Ketosis during hyperglycemia
   - B. Family history of early diabetes ✓
   - C. History of autoimmune disease
   - D. Poor response to sulphonylureas
   - E. Insulin requirement at the diagnosis

Ans: Family history of early diabetes

Explanation: Maturity onset diabetes of The Young is characterized by the development of type 2 diabetes mellitus in patients less than 25 years old. It is typically inherited as an autosomal dominant condition. Typical features of MODY are:

- Develops in patients < 25 years age
- Family history of early onset type 2 DM is present
- Ketosis is not a feature
- Patient has good response to sulphonylureas and insulin is not needed.

5. A 65 year old diabetic patient came for review. He is taking metformin 1 g twice daily. His last HBA1C was 6.3% 6 months back. Today HBA1C is 6.8%. What is the most appropriate next step?
   - A. Add canagliflozin
   - B. Add glimepiride
   - C. Add sitagliptin
   - D. Add pioglitazon
   - E. No change in therapy

Ans: No change in therapy

Explanation: This patient has acceptable glycemic control. Guidelines recommend that the target HBA1C should be less than 6.5% for patients who is using metformin, but if a patient is taking metformin, new drug should only be added if HBA1C rises to 7.5%.

6. A 27 year old female who is 11 weeks pregnant is referred to you as she has gestational diabetes in her first pregnancy. What is the most appropriate management at this stage?
   - A. Check fasting glucose
   - B. Check random glucose
   - C. Perform OGTT
   - D. Check HBA1C
   - E. Start metformin

Ans: Perform OGTT

Explanation: Women who have history of previous gestational diabetes, an oral glucose tolerance test should be performed as soon as possible after booking and at 24 to 28 weeks if the first test is normal. All other women who have risk factors for gestational diabetes should be offered OGTT at 24-28 weeks. The diagnosis of GDM is made when any of the following is met or exceeded:

6.0
7.8

- Fasting: 92 mg/dL (5.1 mmol/L)
- 1 hour: 180 mg/dL (10.0 mmol/L)
- 2 hour: 153 mg/dL (8.5 mmol/L)

9.8mmol

5.6
10.0

7. A 59 year old male who is a known diabetic came for review. He is currently taking metformin 1 g twice daily. His latest HBA1C is 7.9%. The BMI of patient is 31kg/m2. What is the most appropriate next step?
   - A. Add pioglitazon
   - B. Add basal insulin
   - C. Add glipizide
   - D. Add sitagliptin ✓
   - E. Add acarbose

7.5

31g

16 PTU. 34

Ans: Add sitagliptin

Explanation: This diabetic patient on metformin has poor glycemic control and he is also overweight. So the next step should be to add second line agent. As the patient is already obese, we should select the drug which is weight neutral or causes weight loss. From the above option, sitagliptin is the best one, as it is weight neutral. Pioglitazon, SU and insulin cause weight gain. Another option is to strat GLP 1 analogs or SGLT2 inhibitors which cause weight loss.

8. A 25 year old male who is a diagnosed case of type 1 DM presented with vomiting and abdominal pain for 2 days. He is subsequently diagnosed as having DKA precipitated by urosepsis. You have started him on treatment and your house officer wants to know the management. What will be your advice to him?
   - A. Reduce blood glucose to below 250 mg as soon as possible
   - B. Keep blood glucose above 300
   - C. Reduce blood glucose 50mg/ hour

D. Reduce blood glucose 100 mg/hour
E. Monitor blood glucose 6 hourly with insulin infusion

Ans: Reduce blood glucose 50 mg/hour

Explanation: Guidelines recommend that blood glucose should be lowered 50-70mg/ hour in DKA to reduce the risk of developing cerebral edema. Glucose should be monitored 1 hourly in patients who are on insulin infusion.

9. A 62 year old male with history of type 2 DM on metformin came for review today. He also has history of hypertension for 10 years for which he is using indapamide 1.5 mg. Today his blood pressure in clinic is 165/100 mmhg. Labs showed HBA1C 7.1%, microalbuminuria < 3mg and creatinine 1.0. What will be your next best management step?
   A. Add diltiazem
   B. Add amlodipine
   C. Add lisinopril ✓
   D. Add dapagliflozin 30
   E. Add atenolol

AK 30-300

Ans: Add lisinopril

Explanation: This diabetic and hypertensive patient has acceptable glycemic control with no diabetic nephropathy, but his blood pressure is still on higher side. According to ADA guidelines, for patients with diabetes and hypertension, blood pressure targets should be individualized through a shared decision-making process that addresses cardiovascular risk, potential adverse effects of antihypertensive medications and patient preference. For individuals with diabetes and hypertension at higher cardiovascular risk (existing CV disease or ASCVD 10 year risk of > 15%) blood pressure target of less than 130/80 mmhg may be appropriate if it can be safely attained. For patient with lower risk, the target blood pressure is <140/90mmhg. An ACE inhibitor or ARB at the maximum tolerated dose is indicated for blood patient treatment, and it is the recommended first line treatment for hypertension in patients with diabetes.

NDP

10. A 12 year old boy is newly diagnosed with type 1 DM. His current weight is 40kg. What dose of basal insulin should be initiated for him?
    A. 10 units glargine ✓
    B. 6 units detemir
    C. 6 units glargine
    D. 20 units detemir
    E. 20 units glargine

0.5 units/kg/day

40

5/10

20

20 units

10

Ans: 10 units glargine

Explanation: All patients with Type 1 diabetes should be treated with multiple daily injections of prandial and basal insulin, or continuous subcutaneous insulin infusion. Most people with type 1 diabetes should use rapid acting insulin analogues to reduce hypoglycemia risk. The total daily insulin requirements can be estimated initially based on weight, with typical doses ranging from 0.5 to 1 units per kg per day. 0.5 units per kg per day is typical starting dose in patients with type 1 diabetes, who are metabolically stable, with half administered as prandial insulin given to control the blood glucose after meals and the other half as basal insulin to control glycaemia in the periods between meal absorption. Commonly used basal insulins in type 1 DM are glargine and detemir. In this patient, who is 40 kg, the initial total insulin dose is 20 units. Half of this should be given as basal insulin (10 units of glargine or detemir) and other half as pre prandial before each meal (3 units of ultrashort acting insulin).

11. Which of the following non insulin treatment is approved for treatment of type 1 DM along with insulin?
    - A. Metformin
    - B. Liraglutide
    - C. Dapagliflozin
    - D. Pramlintide
    - E. Sitagliptin

Ans: Pramlintide

Explanation: Pramlintide is based on the naturally occurring beta cell peptide amylin and is approved for use in adults with type 1 diabetes mellitus. It reduces HBA1C 0.3% when used along with insulin. Metformin, liraglutide and dapagliflozin are studied in type 1 DM but they are not currently recommended as treatment till date.

12. A 52 year old diabetic patient has anteroseptal wall STEMI 4 weeks ago which was treated with PCI. Patient is using metformin 1 g BD and last HBA1C 2 weeks ago was 7.1%. What should be the next best management step for this patient?
    - A. Continue metformin only
    - B. Add gliclazide
    - C. Add dapagliflozin
    - D. Add pioglitazon
    - E. Add sitagliptin

7.1%

Ans: Add dapagliflozin

Explanation: ADA guidelines recommend that among patients with type 2 diabetes who have established atherosclerotic cardiovascular disease or indicators of high-risk, established kidney disease or heart failure, a sodium glucose transporter 2 inhibitor or glucagon-like peptide-1 receptor agonist with demonstrated cardiovascular disease benefit is recommended as part of the glucose lowering regime **independent** of HBA1C level.

13. A 32 year old woman is diagnosed with gestational diabetes after being administered an oral glucose tolerance test during the 28th week of gestation. She has not been able to reduce or control her glucose readings with lifestyle interventions alone and her obstetrician has referred this patient for further management. What will you recommend as treatment for her?
    - A. Glyburide
    - B. Insulin glargine
    - C. NPH insulin
    - D. Liraglutide
    - E. Metformin

Ans: NPH insulin

Explanation: For the management of gestational DM ADA has following recommendations:

- Lifestyle behavior change is an essential component of management of gestational diabetes and may suffice for the treatment of many women. Insulin should be added if needed to achieve targets.
- Insulin is the preferred medication for treating hyperglycemia in gestational diabetes mellitus. Metformin and glyburide should not be used as first line agents as both cross the placenta to the fetus.
- Glargine use in pregnancy has no data and is a class C drug. The better regimen is NPH insulin which is category B in pregnancy. NPH insulin is the only basal insulin that has been adequately studied in pregnancy
- Blood glucose target in gestational DM are, FBS < 95 mg/dl and either one hour postprandial < 140 or two hour postprandial < 120 mg/dl.

14. What is the blood pressure target in a patient with diabetes mellitus and hypertension during pregnancy?
    A. < 140/90 mmhg
    B. < 145/95 mmhg
    C. < 135/85 mmhg ✓ 140.
    D. < 130/80 mmhg
    E. < 120/80 mmhg

NPH

Ans: < 135/85 mmhg

Explanation: In normal pregnancy, blood pressure is lower than in the non pregnant state. In a pregnancy complicated by diabetes and chronic hypertension, a target goal blood pressure of < 135/85mmhg is recommended. Blood pressure below 120 /80 should be avoided. ACEi, ARB, atenolol and diuretics should be avoided.

15. A 41 year old diabetic female has a BMI of 33 kg/m2. She wants some medications which can control her diabetes and weight, but she does not want injections. Which of the following oral anti diabetic medications is most likely to result in weight loss for patient with DM?
    A. Glyburide
    B. Liraglutide ✓
    C. Dapagliflozin
    D. Pioglitazon
    E. Sitagliptin

Ans: Dapagliflozin

Explanation: Both GLP 1 agonist and SGLT2 inhibitors cause weight loss. GLP 1 agonist are injectable agents and only oral anti diabetic agent causing weight loss is SGLT2 inhibitors. Semaglutide is the only GLP 1 agonist coming in oral formulation. Glyburide and pioglitazon cause weight gain whereas sitagliptin and metformin are weight neutral agents. The weight loss efficacy of GLP 1 agonist is semaglutide> liraglutide > dulaglutide > exenatide > lixisenatide. Average weight loss by SGLT2 inhibitors is 2-4% or 3 kg in 6 months period.

16. A 57 real old man has had type 2 diabetes for approximately 15 years. You want to initiate insulin therapy today due to his elevated HBA1C despite triple oral therapy. Which of the following is the most appropriate initial option for him?
    - [✓ A. Glargine 10 U at bedtime]
    - B. Lispro 10 U at bedtime
    - C. Aspart 10 U every morning
    - D. 70/30 NPH and aspart twice daily
    - E. Regular insulin 10 units three times daily

7.5

Ans: Glargine 10 U at bedtime

Explanation: Basal insulin alone is the most convenient and recommended initial insulin and can be added to metformin and other oral agents. The principal action of basal insulin is to restrain hepatic glucose production and limit hyperglycemia overnight and between meals. Control of fasting glucose can be achieved with human NPH insulin or a long acting insulin analogue like glargine or detemir. The long acting insulin analogue has low risk of hypoglycemia compared to NPH and are recommended as the first step. Guidelines recommend 10 U of glargine or NPH at bedtime and then titrate by 2 units every 3 days to achieve FBS target without hypoglycemia. Prandial insulin is used if HBA1C is not controlled despite the titrated basal insulin use.

17. Which of the following statements most accurately describes one of the treatment goals for type 2 diabetes?
    - A. Reduce risk for macrovascular complications through glycemic control
    - B. Reduce risk for metabolic and neurologic complications through control of lipids
    - C. Reduce risk for microvascular complications through glycemic and blood pressure control
    - D. Reduce risk for microvascular complications through control of lipids
    - E. Reduce risk for microvascular complications through control of lipids and blood pressure

Ans: Reduce risk for microvascular complications through glycemic and blood pressure control

Explanation: One of the goals of type 2 diabetes treatment is to reduce the risk for microvascular complications, such as eye, nerve, and kidney diseases, through glycemic and blood pressure control. Other goals are to reduce the risk for macrovascular complications, such as coronary, cerebrovascular, and peripheral vascular disease, through control of lipids and blood pressure, as well as through smoking cessation; and to reduce the risk for metabolic and neurologic complications through glycemic control.

18. In addition to hypertension, which of the following has the highest prevalence in the early stages of type 2 DM?
    - A. Cardiovascular disease
    - B. Neuropathy
    - C. Nephropathy
    - [✓ D. Obesity]
    - E. Peripheral vascular disease

Ans: Obesity

Explanation: Along with hypertension, the majority of patients in the early stages of type 2 DM are overweight or obese. Risk factors for type 2 DM include weight > 120% of desirable body weight. In addition to diet and exercise in patients with type 2 DM who are overweight or obese, antiglycemic medications associated with weight loss (e.g., GLP-1 agonist or SGLT2 inhibitors) are suggested in addition to metformin. Metformin is also recommended in patients with type 2 DM who require insulin. CVD, diabetic neuropathy, and chronic kidney disease are comorbidities that are more prevalent in patients with advanced type 2 DM.

19. Which of the following is most prevalent pattern of dyslipidemia in patients with type 2 DM?
    - A. High LDL, low TGs, Low HDL
    - B. Low LDL, high TGs, low HDL
    - C. High LDL, high TGs, low HDL ✓
    - D. High LDL, high TGs, high HDL
    - E. Normal LDL, high TGs, normal HDL

Ans: High LDL, high TGs, low HDL

Explanation: High LDL-C and TG levels and low HDL-C levels is the most prevalent pattern of dyslipidemia in patients with type 2 DM. Regarding the treatment of dyslipidemia, statin therapy remains the recommended initial treatment for dyslipidemia.

20. Which of the following is considered a risk factor associated with more severe symptoms of diabetic neuropathy?
    - A. BMI 21 kg/m2
    - B. Young age
    - C. Dyslipidemia ✓
    - D. New onset DM
    - E. Insulin use

Ans: Dyslipidemia

Explanation: Risk factors that are associated with more severe symptoms include Poor glycemic control, advanced age, hypertension, and long duration of DM, dyslipidemia, smoking, heavy alcohol intake, HLA-DR3/4 phenotype and tall height.

21. Which of the following is the most common form of neuropathy in patients with DM?
    - A. Plexopathy
    - B. Cranial neuropathy
    - C. Focal neuropathy
    - D. Distal symmetrical neuropathy
    - E. Mononeuritis multiplex

gloved Stocking

Ans: Distal symmetrical neuropathy

Explanation: Approximately 45-50% of patients with diabetes have some peripheral neuropathy. Neuropathy is estimated to be present in 7.5% of patients at the time of diabetes diagnosis. More than half of cases are distal symmetric polyneuropathy. Focal syndromes such as carpal tunnel syndrome (14%-30%), radiculopathies/plexopathies, and cranial neuropathies account for the rest.

22. A 17 year old man with type 1 DM on insulin therapy presented with vomiting and feeling unwell. He has not taken his full insulin dose because he has URTI and was off food. His BRS is 560 mg/dl

and there are 4+ ketones on urinalysis. ABGs showed pH 7.13, HCO3 8, PCO2 24, Na 129 and K 6.2. Which of the following is the most appropriate initial treatment?

A. 10 units regular insulin+ dextrose
B. Calcium gluconate 10 ml stat
C. 0.9% saline 1 L bolus
D. Sodium bicarbonate IV
E. 20 units S/C insulin

Ans: 0.9% saline 1 L bolus

Explanation: This is a classic presentation of DKA and the most important initial treatment is fluid resuscitation. Potassium derangements are common and need careful management. Potassium is driven into cells by insulin. Serum potassium levels are therefore often high on presentation while blood insulin levels are depleted. Despite this, total body potassium is low due to fluid losses and requires careful monitoring in replacement during treatment. There is no need to treat hyperkalemia initially unless patient has ECG changes. With the insulin infusion, potassium will go back into cells. Sodium bicarbonate is only indicated when pH is less than 7.0.

23. A 62 year old female with history of T2DM for 15 years presented with progressive altered sensorium for 3 days. Patient was not taking her usual diabetes medications due to fever and urinary tract infection. RBS on presentation was 780 mg/dl. Other labs were done which showed Na 155, K 3.4, HCO3 22, Cl 125, pH 7.39 and urinalysis showed 1+ ketones and pus cells. What is the diagnosis in this patient?

A. Diabetic ketoacidosis
B. Lactic acidosis
C. Hyperosmolar hyperglycemic state
D. Starvation ketoacidosis
E. Sepsis due to UTI

Ans: Hyperosmolar hyperglycemic state

Explanation: This is a classic presentation of hyperosmolar hyperglycemic state which occurs in patients with type 2 diabetes mellitus. The criteria for the diagnosis of HHS is:

- Blood glucose > 600 mg/dl
- Serum osmolality > 310 mosm/kg
- Blood pH > 7.3
- Serum HCO3 > 15 meq/l
- Normal anion gap < 12

Our patient has blood glucose 780mg/dl, osmolality more than 350, pH 7.39, HCO3 22 and anion gap 8.

24. A 47 year old lorry driver with history of diabetes mellitus on metformin and gliclazide came for review. His HBA1C is 7.9% and his BMI is 36 kg/m2. He is frustrated about his high weight. What would be the most appropriate next step in his treatment?

A. Stop gliclazide
B. Add sitagliptin
C. Add dulaglutide

17/17

D. Add glargine
E. Add pioglitazon

Ans: Add dulaglutide

Explanation: This obese patient is having poor glycemic control and just stopping gliclazide would not be an appropriate step. Also gliclazide has less potential of causing weight gain as compared to first generation SUs. The guidelines recommend that for patients who are obese and target HBA1C is not achieved, a GLP 1 agonist with high potential of causing weight loss or SGLT2 inhibitors should be used.

25. A 55 year old diabetic patient came for your advice before Ramadan. He is currently taking 850 mg metformin twice daily. His HBA1C is 6.8%. What is the most appropriate advice you will give to him?
    A. Stop metformin
    B. Metformin 1.5 g after sunset
    [✓ C. Metformin 500 mg at sehar and 1g at sunset]
    D. Metformin 850 mg at sehar and 850 mg at sunset
    E. Advice him not to fast

Ans: Metformin 500 mg at sehar and 1 g at sunset

Explanation: Fasting is a personal decision and a well controlled DM on drugs, which do not cause hypoglycemia, is not a contraindication for fasting. If patient is using metformin, 2/3rd of the pre Ramadan metformin dose should be taken at sunset and 1/3rd at sehar time. If patient is taking once daily SU, it should be taken at sunset. If taking twice daily SUs, then dose at sehar time should be reduced. Patient taking pioglitazon can continue the same dose at same time. Patients who are on insulin therapy should be managed individually.

26. A 56 year old male who is a known diabetic on metformin 1g BD and gliclazide MR 60 mg came for review. He is self monitoring his blood sugar and you checked the values of the previous months which showed consistently high fasting blood sugar and normal postprandial sugar levels. HBA1C is 7.9% which was 7.1% 3 months back. What should be your next best management step?
    A. Add sitagliptin at night
    B. Add pioglitazon at night
    [✓ C. Add liraglutide at night]
    [✓ D. Add glargine at night]
    E. Add canagliflozin at night

7.5

Ans: Add glargine at night

Explanation: This diabetic patient is having Dawn phenomena. The dawn phenomenon refers to periodic episodes of hyperglycemia occurring in the early morning hours before, and to some extent after, breakfast. It differs from the Somogyi effect in that it is not preceded by an episode of hypoglycemia. In non diabetics, blood glucose and plasma insulin levels remain steady through the night, with only a small increase in insulin secretion before dawn, which serves to depress hepatic glucose production. Hyperglycemia is prevented by this physiologic surge of insulin. Patients with type 2 diabetes are more likely affected by early morning dysregulation of hepatic glucose production because of the inability to produce compensatory insulin secretion. Patients with diabetes will manifest the dawn phenomenon clinically with persistent and worsening early morning hyperglycemia, which is difficult to control. Often found early in the disease process, this is associated with worsening HbA1c levels. When the presence of the dawn phenomenon is detected, especially when associated with the extended dawn phenomenon, an individual patient should be considered for earlier and more aggressive control of glucose. Oral hypoglycemic agents have failed to show adequate control of the dawn phenomenon, while insulin therapy has been shown much more effective. Long acting insulin like glargine at bedtime is the best initial option and if not controlled with this then continuous insulin infusion is the definite treatment.

27. A 58-year-old female with a 12-year history of type 2 diabetes mellitus presented with pain and stiffness in both hands for 1 year. The pain was described as dull and aching lasting throughout the day and worsening at night. She reported morning stiffness in her hands lasting for 5 minutes. She admitted limited movements of all joints in her hands with associated tightening of the skin. She denied any changes in the color of her skin in her fingers with cold weather. Her glycemic control was poor. What is the most probable diagnosis?

A. Amyloidosis
B. Systemic sclerosis
[✓ C. Diabetic cheiroarthropathy]
D. Carpal tunnel syndrome
E. Charcoat arthropathy

Ans: Diabetic cheiroarthropathy

Explanation: Diabetic cheiroarthropathy (DCA) is usually characterized by painless limited extension of the proximal metacarpophalangeal joints and/or interphalangeal joints with spontaneous flexion of the fingers. There is decreased ability to fully flex or fully extend the fingers. The affliction can be associated with significant pain and stiffness. A tight waxy skin surface over the dorsum of the hand usually completes the clinical picture. It is usually diagnosed clinically by prayer sign and table top signs. The prayer sign is said to occur whenever there is incomplete approximation of one or more of the digits when the patient attempts to approximate the palmar surfaces of the proximal and distal interphalangeal joints with palms pressed together and the fingers abducted. If patient is unable to completely lay palms flat on a horizontal surface, it denotes a positive tabletop sign. Treatment relies primarily on glycemic control, in addition, to non-steroidal anti-inflammatory drugs and physical therapy. It is also commonly associated with the presence of other microvascular diabetic complications.

28. Which of the following is true regarding dapagliflozin use in patients with type 2 diabetes mellitus?

A. Increase CVS disease risk
B. Decreased LDL level
[✓ C. Increase risk of amputation] UTI
D. Cause weight gain
E. Increase risk of pancreatitis

Ans: Increase risk of amputation

Explanation: SGLT2 inhibitors are associated with a lower risk of cardiovascular disease and death from cardiovascular cause. They are recommended in patients with history of atherosclerotic cardiovascular disease or high risk of having atherosclerotic CV disease irrespective of the level of HBA1C. These agents cause weight loss and with higher risk of amputation of the toes and developing genitourinary infections.

All SGLT2 inhibitors are associated with a modest increase in LDL level. Pancreatitis risk is increased by GLP 1 agonists.

29. A diabetic patient with history of ischemic heart disease presented with bilateral lower limb swelling after starting a new drug for his glycemic control. Examination showed bilateral fine crackles at lung bases. Which drug is commonly associated with this presentation?
    - A. Metformin
    - B. Glargine
    - C. Pioglitazon
    - D. Sitagliptin
    - E. Canagliflozin

Ans: Pioglitazon

Explanation: Pioglitazon is associated with fluid retention and edema formation 10-15% of patients and it can results in heart failure. This medicine should be avoided in patients with IHD and is contraindicated in NYHA class III and IV heart failure.

30. A known case of type 1 DM on treatment with insulin is also diagnosed as having autoimmune hemolytic anemia. Patient is on basal bolus insulin therapy and is taking azathioprine for Hemolytic anemia. Which test should be used to monitor glycemic control in this patient?
    - A. HBA1C
    - B. Fasting glucose
    - C. Random glucose
    - D. [✓ Serum fructosamine]
    - E. Urinalysis for glucosuria

Ans: Serum fructosamine

Explanation: Any condition that shortens erythrocytes survival or decrease mean erythrocyte age like recovery from acute blood loss or hemolytic anemia, will falsely lower hba1c. In these conditions, alternative method such as serum fructosamine should be used for monitoring of the glycemic control. Fructosamine generally reflects the state of glycemic control for only the preceding 1-2 weeks.

31. A patient with CKD 3b due to diabetic nephropathy is taking insulin humulin 70/30. Which of the following is the preferred method of monitoring glycemic control in this patient?
    - A. HBA1C
    - B. Serum fructosamine
    - C. Urinary glucose
    - D. Fasting blood sugar
    - E. Random blood sugar
    - F. [✓ Fasting and random sugar]

Anemia

HbA1C

Ans: Fasting and random sugar

Explanation: HbA1c is potentially problematic as a measure of glycemic control in CKD due to alterations in erythrocyte lifespan. Further, a common complication of CKD is anemia, which itself affects erythrocyte turnover and is commonly treated with iron and/or erythropoietin. These therapies can stimulate red cell production, increasing the number of young erythrocytes. In this setting, the proportion of hemoglobin molecules with glucose attached is lowered due to the shortened time for glycation, resulting in lower HbA1c than expected. Fructosamine value is also not accurate in CKD and appropriate method is the home monitoring of fasting and 2 hour postprandial glucose monitoring.

32. Which of the following is the targeted HBA1C level in all diabetic patients?
    - A. Less than 6.5%
    - B. Less than 7%
    - C. Less than 7.5%
    - D. Less than 8%
    - E. should be individualized

Ans: Should be individualized

Explanation: There is no single HBA1C target for all the diabetic patients. Instead it should be individualized for different patients' categories. For non-pregnant healthy adults the target is < 6.5% if it is achieved without hypoglycemia or polypharmacy. Otherwise target is < 7%. For pregnant female, the target is 6-6.5% and < 6% if possible without significant hypoglycemia. In older healthy adults, the target is < 7.5% and in frail adults with limited life expectancy, the target is < 8.5%. In children and adolescent the target HBA1C is < 7.5%.

33. A 65 year old with T2DM on mixtard 30 insulin, metformin and sitagliptin presented with nausea, bloating and abdominal fullness after taking meals. He also complains that his blood sugar is too much unpredictable now and sometimes it is more than 300 and sometimes less than 70. What should be your next management step?
    - A. Stop metformin
    - B. Stop sitagliptin
    - C. Add liraglutide
    - D. Add domperidone ✓ [illegible]
    - E. Reduce insulin dose

Ans: Add domperidone

Explanation: History of nausea, bloating, early satiety with unexpected fluctuations and variability in blood glucose in diabetic patient is suggestive of development of gastroparesis. Metoclopramide or domperidone should be started initially with good glycemic control. GLP 1 agonist should be avoided because they cause decrease gastric emptying. Sitagliptin does not cause significant decrease in gastric emptying.

34. A 55 year old female with history of chronic nocturnal diarrhea not responding to antibiotics came for advice. She is too much frustrated because she soils her clothes at night without awareness. Her stools analysis, culture and ova screening is negative. What would you recommend?
    - A. Pelvic muscles exercise
    - B. Lopermide therapy
    - C. Wear absorbent pads
    - D. Metoclopramide
    - E. Bethanechol therapy

Ans: Lopermide therapy

Explanation: Diabetic diarrhea is a troublesome gastrointestinal complication of diabetes. This condition persists for several weeks to months, and it frequently accompanies fecal incontinence. The cause of diabetic diarrhea is not fully understood, but autonomic neuropathy is thought to be an underlying mechanism. It is sometimes associated with bacterial overgrowth, so broad spectrum antibiotics should be used initially. If not controlled with this, Lopermide or diphenoxylate with atropine should be given to reduce the frequency and to improve the consistency. Codeine and clonidine can also be used in severe case.

35. A 52 year old diabetic patient is admitted in ICU due to severe CAP. You have started him on insulin infusion. What should be the target blood glucose level in this patient?
    - A. Less than 140 mg/dl
    - B. 100-140 mg/dl
    - C. 140-180 mg/dl
    - D. 180-200 mg/dl
    - E. More than 200 mg/dl

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Ans: 140-180 mg/dl

Explanation: ICU patients with diabetes mellitus or new onset hyperglycemia with blood sugar more than 180 should be treated with insulin infusion with aiming for glucose level 140-180 mg/dl. Blood glucose below 140 mg/dl is not beneficial and can be harmful.

36. Which of the following conditions is specifically associated with the presence of diabetes mellitus?
    - A. Xanthogranulamotous pyelonephritis
    - B. Emphysematous pyelonephritis ✓
    - C. Emphysematous cystitis
    - D. Necrotizing Pneumonia
    - E. Vaginal candidiasis

140-18

Ans: Emphysematous pyelonephritis

Explanation: Three life-threatening infections associated specifically with diabetes are emphysematous pyelonephritis, emphysematous cholecystitis and mucormycosis. Emphysematous pyelonephritis is a severe, necrotizing form of acute multifocal bacterial nephritis with extension of the infection through the renal capsule. This leads to the presence of gas within the kidney substance and in the perinephric space.

37. A 57 year old diabetic on NPH 20 units twice daily and 10 units of regular insulin three times daily came for review for his uncontrolled fasting blood sugars. You advised him to monitor 3 am blood sugar which is lower than 60 for 1 week. How will you adjust his insulin?
    - A. NPH 10 units at bedtime
    - B. Regular insulin 5 units pre-dinner
    - C. NPH 30 units at bedtime
    - D. Regular insulin 20 units per dinner
    - E. Regular insulin 15 units pre breakfast

Ans: NPH 10 units at bedtime

Explanation: This is Somogyi effect in which nocturnal hypoglycemia leads to a surge of conterregulatory hormones to produce early morning hyperglycemia. This effect can be treated by eliminating the dose of intermediate insulin at dinnertime and giving it at a lower dose at bedtime or by supplying more food at bedtime.

38. A Young lady with type 1 DM for 12 years on insulin with diabetic nephropathy with creatinine clearance of 65ml/min/1.73m2 on enalapril came for opinion regarding pregnancy. What will you advise her?
    - A. Enalapril is safe in 1st trimester
    - B. Pregnancy has no effect on her disease
    - C. Nephropathy gets worsened but will reverse after pregnancy
    - D. Nephropathy gets worsened and will progressed after pregnancy
    - E. There is decrease risk of pre eclampsia

Ans: Nephropathy gets worsened and will progressed after pregnancy

Explanation: Careful counseling of the woman and her partner of the risk for herself and the newborn is important before the couple can make a well considered decision regarding pregnancy in diabetes. Serum creatinine >1.8 is the best predictor of the risk of pregnancy-induced decline in maternal kidney function leading to ESRD during pregnancy or shortly afterward. In addition, an updated diabetes status, including self-monitored glucose values, HbA1c, risk of severe hypoglycemia, degree of diabetic retinopathy, serum creatinine, BP, and proteinuria, is necessary to estimate the risk for complications during pregnancy in a woman with diabetic nephropathy. In addition to the level of BP per se, the number of antihypertensive agents to control the BP sufficiently before pregnancy is also of importance. ACE inhibitors and ARBs are absolutely contraindicated in pregnancy and the presence of microalbuminuria increased the risk of developing pre eclampsia.

39. A 61 year old diabetic on Metformin and gliclazide came with complaints of recurrent episodes of hypoglycemia. You have checked the RFTs which showed serum creatinine of 4.1. What should be your next best management step?
    - A. Stop gliclazide
    - B. Start pioglitazon
    - C. Stop metformin
    - D. Start insulin and stop oral agents
    - E. Continue same treatment

Ans: Start insulin and stop oral agents

Explanation: Metformin is contraindicated in patients with creatinine clearance of less than 30 and should be used with caution in patients with creatinine clearance < 45 ml/min/1.73m2. Gliclazide is metabolized by liver and can be used in stage 3 CKD but it is also contraindicated with creatinine clearance < 30. For stage 4 and 5 CKD, insulin is the best treatment for glycemic control.

40. A 27 year old female with type 1 diabetes mellitus on insulin treatment is pregnant. She came for your advice during pregnancy and the associated risk related to her diabetes. Which of the following conditions has no effect on fetal well being?
    - A. Hyperglycemia

B. Hypoglycemia
C. Ketonuria
D. Ketoacidosis
E. Microalbuminuria

Ans: Ketonuria

Explanation: Simple ketonuria has no significant effect on fetus well being and it can be normally present during pregnancy. All the other factors adversely affect the outcome of pregnancy.

41. A 25 year old female presented with recurrent attacks of early morning fits associated with urinary incontinence for 2 months. When investigated her fasting sugar is consistently below 50 for 1 week. Her C peptide and insulin levels are high. What is the diagnosis?
    A. Insulinoma
    B. Glucagonoma
    C. Factitious hypoglycemia
    D. Addison disease
    E. Functional hypoglycemia

Ans: Insulinoma

Explanation: The typical symptoms of hypoglycemia with documented hypoglycemia associated with high C peptide and high insulin levels are suggestive of endogenous inappropriate insulin production by Insulinoma. Factitious hypoglycemia is associated with high insulin and low C peptides.

42. A 46 year old female with recently diagnosed DM presented with history of weight loss despite adequate blood glucose control. She has developed a pruritic rash involving her genitalia and upper thighs which is progressively worsening and becomes bullous. She also complains of recurrent oral ulceration with angular cheilitis and stomatitis. What is the most probable diagnosis?
    A. Necrobiosis diabeticorum
    B. Glucagonoma syndrome
    C. Dermatitis herpetiformis
    D. Behcets syndrome
    E. Insulinoma

Ans: Glucagonoma syndrome

Explanation: Glucagonomas are neuroendocrine tumors of the pancreatic islets that secrete glucagon. Glucagonoma syndrome occurs due to the effects of elevated glucagon levels secreted by the tumor. Glucagonoma syndrome also goes by the acronym 4D syndrome, consisting of dermatosis, diabetes, deep vein thrombosis, and depression.

- The dermatoses associated with glucagonoma syndrome is called necrolytic migratory erythema. It is present in up to 90% of the patients. It is widespread, with main areas of involvement being perioral, perigenital regions and the extremities. It often starts as pruritic and painful erythematic papules or plaques which gradually enlarge and coalesce to form bullous lesions.

- Mucosal involvement presents in the form of angular cheilitis, glossitis, stomatitis, and blepharitis. Patients may also have hair loss and nail dystrophy.
- Weight loss occurs in about 90% of the patients with glucagonoma syndrome and is also one of the presenting features.
- Diabetes mellitus is present in nearly 80% of the patients. It is mostly mild as beta cell function of the pancreas is preserved.
- Deep vein thrombosis is noted in nearly 50% of the patients.
- Depression, occurring in about 50% of the patients, may be related to the chronic dermatosis.

43. You want to start insulin therapy in a type 2 diabetes mellitus patient but he has injection phobia and wants to know about the inhaled insulin use which he has read on internet. Which of the following test is recommended before using this mode of delivery of insulin?
    A. Renal functions
    B. Chest X-RAY
    [✓ C. Spirometry]
    D. Echocardiography
    E. LFTs

Ans: Spirometry

Explanation: Inhaled insulin is a **recombinant** regular human insulin administered as a powder for oral inhalation. It is used to control postprandial glucose levels only. Before initiating it, it is recommended to perform a detailed medical history, physical examination, and spirometry (FEV1) to identify potential lung disease in all patients. It is contraindicated in patients with chronic lung disease because of the risk of bronchospasm. Assess pulmonary function before initiating, after 6 months of therapy, and annually, even in the absence of pulmonary symptoms.

44. Which of the following is not an absolute indication of insulin therapy in patients with diabetes mellitus?
    A. Type 1 diabetes mellitus
    B. Diabetes related to Hemochromatosis
    C. Diabetes related to acromegaly
    D. Diabetes related to cystic fibrosis
    E. Diabetes with decompensated cirrhosis

Ans: Diabetes related to acromegaly

Explanation: Diabetes mellitus is a frequent complication of acromegaly with a prevalence of 15-35%. Growth hormone and IGF-1 have complex effects on glucose metabolism. Insulin resistance, hyperinsulinaemia and increased gluconeogenesis combine to produce a metabolic milieu which leads to the development of diabetes in acromegaly. Diabetes associated with acromegaly is not an absolute indication for insulin use. It is treated with bromocriptine and treatment of acromegaly. All the other conditions are absolute indication for insulin therapy and oral medications cannot be used in these conditions.

45. A 70 year old male with long standing diabetes presents with severe pain in his left thigh. On examination there is marked wasting of his quadriceps on the left side and loss of knee reflex. What is most useful for the management?

A. Gabapentin
B. Duloxetine
C. Good glycemic control
D. Vitamin B12 and B6
E. Tramadol oral

Ans: Good glycemic control

Explanation: Diabetic lumbosacral radiculoplexus neuropathy (DLRPN), also known as diabetic amyotrophy is asymmetrical, progressive, diffuse lower extremity pain, motor-weakness, accompanied with muscle wasting, weight loss, areflexia, with a clear relation to uncontrolled diabetes and close to complete recovery with appropriate glycemic management. It is a rare presentation of diabetic neuropathy, occurring in approximately 1% of all diabetic patients. Good glycemic control is the cornerstone in management of amyotrophy. Gabapentin and duloxetine can be used for severe pain.

46. Which of the following is the earliest sign of diabetic retinopathy?

A. Hard exudates
B. Cotton wool spots
C. Micro-aneurysms
D. Retinal hemorrhage
E. Neo secularization

Ans: Micro-aneurysms

Explanation: The earliest sign of diabetic retinopathy is the development of micro-aneurysms (MA). MAs are saccular outpouchings of retinal capillaries that have been weakened by a loss of intramural pericytes.

Stages of diabetic retinopathy:

Stage 1: Mild non-proliferative diabetic retinopathy (NPDR:

These patients have at least one MA but no other findings. Findings are often subtle, so close inspection and monitoring are essential. These patients should have a dilated eye examination every 12 months.

Stage 2: Moderate NPDR:

These patients have hemorrhages or MAs in one to three retinal quadrants and/or cotton wool spots, hard exudates, or venous beading. Patients with moderate NPDR should be seen every 6 to 8 months.

STAGE 3: SEVERE NPDR:

These patients have intraretinal hemorrhages (> 20 in each quadrant), venous beading in two or more quadrants, or an IRMA (intraretinal microvascular abnormalities) in one or more quadrants. This is known as the 4:2:1 rule. These findings must be in the absence of neovascularization, which would indicate proliferate retinopathy. Patients with severe NPDR should be monitored using both macular OCT and fluorescein angiography to detect any diabetic macular edema or early neovascularization. Referral to a retina specialist is recommended, and patients should be monitored every 3 to 4 months with dilated fundus examination.

STAGE 4: PROLIFERATIVE DIABETIC RETINOPATHY:

These patients had NPDR that has progressed to PDR, and they exhibit either neovascularization of the disc/elsewhere or vitreous/preretinal hemorrhage. These patients require immediate referral to a retina specialist for further testing and treatment. Peripheral neovascularization is usually treated with laser panretinal photocoagulation. Anti-VEGF intravitreal injections may be given in conjunction with PRP. Until their disease stabilizes, these patients need to be monitored monthly by a retina specialist.

Hard exudates: Hard exudates are largely made up of extracellular lipid which has leaked from abnormal retinal capillaries. Hard exudates are found principally in the macular region and as the lipids coalesce and extend into the central macula (fovea), vision can be severely compromised.

Soft exudates: Soft exudates or Cotton-wool spots are greyish-white patches of discoloration in the nerve fibre layer which have indistinct (fluffy) edges. They are the result of local ischemia which leads to disruption of axoplasmic flow. Cotton-wool spots are common and one or two do not require intervention. However, multiple cotton wool spots (more than 6 in one eye) indicate generalized retinal ischemia and this is regarded as a pre-proliferative state.

INTRARETINAL HAEMORRHAGES: Intraretinal hemorrhages may be 'dot' or' blot' shaped (termed 'dot/blot hemorrhages') or flame shaped depending upon their depth within the retina. The capillary network in the posterior retina is found in two layers; a superficial one in the nerve fibre layer and a deeper on within the inner nuclear layer. Hemorrhage within the nerve fibre layer tends to be flame shaped, following the divergence of axons and occurs in hypertensive retinopathy. In the inner layer, hemorrhage is aligned at right angles to the retinal surface and is consequently viewed end-on when using an ophthalmoscope; these hemorrhages appear dot or blot shaped. Multiple blot hemorrhages imply significant retinal ischemia, characteristic of pre-proliferative retinopathy.

VENOUS ABNORMALIITIES: Venous dilatation, beading and duplication occur as retinal ischemia progresses. Beading is a useful sign of diffuse retinal ischemia.

INTRARETINAL MICROVASCULAR ABNORMALITIES (IRMAS): Intraretinal microvascular abnormalities are areas of capillary dilatation and intraretinal new vessel formation. They arise within ischaemic retina and when they are present in numbers are a feature of pre-proliferative retinopathy.

NEOVASCULARISATION: As the retina becomes more ischaemic new blood vessels may arise from the optic disc or in the periphery of the retina. The vessels usually originate from large veins and are initially seen as fine tufts on the surface of the disc or from the vessels of the major arcades of vessels. The new vessels are fragile and bleed easily, hence the importance of proliferative retinopathy.

ENDOCRINOLOGY:

1. A 25 year old lady presented with complaints of feeling nervous, excess sweating and tired all the times. On examination, she has hand tremors and a rapid heartbeat. Pulse is 125/min. You ordered thyroid function tests. Which of the following sets of laboratory results will be most consistent with her clinical picture?

   N/S

   A. TSH high, T3 low, T4 low
   B. TSH normal, T3 low, T4 low
   C. TSH low, T3 high, T4 high ✓ ✓
   D. TSH low, T3 low, T4 low
   E. TSH high, T3 low, T4 high

Ans: TSH low, T3 high, T4 high ✓

Explanation: The symptoms are typical of thyrotoxicosis and the typical abnormality in thyrotoxicosis is suppressed TSH with high T3 and T4. TSH high with low T3 and T4 occurs in hypothyroidism. Normal TSH with low T3 and T4 occurs in moderate sick euthyroid syndrome. Low TSH with low T3 and T4 occurs in severe and prolonged systemic illness with sick euthyroid syndrome and rarely in secondary hypothyroidism. High TSH with high T4 occurs in secondary hyperthyroidism which is also rare.

2. A 32 year old female presented with weight loss and excessive sweating has low TSH with high T3 and T4. Which of the following test is used next to differentiate between Graves' disease and other causes of hyperthyroidism?

   30-50 y A ✓

   A. Thyroid ultrasound
   B. Doppler scan of thyroid
   C. TSH receptor antibodies ✓
   D. Anti TPO antibodies
   E. Anti-peroxidase antibodies

Ans: TSH receptor antibodies

Explanation: The first screening test for hyperthyroidism is TSH level. It is the most sensitive and specific test for detection of hyperthyroidism. If TSH is low, the next best test is measurement of free T3 and T4 level. In overt hyperthyroidism, these will be elevated. The next step is to differentiate between Grave's disease and other causes of hyperthyroidism because Grave's disease is the most common cause of hyperthyroidism. To differentiate between these, the next best test is to measure TSH receptor antibodies which is a sensitive and specific test for rapid and accurate diagnosis of Grave's disease. If these antibodies are negative, hyperthyroidism is due to toxic adenoma, MNG or subacute thyroiditis. Ultrasound, both conventional and color flow or Doppler is used to support the diagnosis of Grave's hyperthyroidism. Scintigraphy is recommended when thyroid nodularity coexists with hyperthyroidism and prior to radioactive iodine therapy. Anti-peroxidase antibodies are present in hypothyroidism due to Hashimoto thyroiditis. Anti-TPO antibodies are used in the diagnosis of Hashimoto thyroiditis.

3. A 25 year old female is diagnosed as a case of Grave's disease. Which of the following is not a feature of high serum thyroid hormone?
   A. Tachycardia
   B. Hypertension

C. Tremors
[✓ D. Increased peripheral resistance]
E. Diarrhea

Ans: Increased peripheral resistance

Explanation: Total peripheral resistance is decreased in Graves' disease and increased in hypothyroidism. Hypertension caused by hyperthyroidism is systolic due to high cardiac output and in hypothyroidism it is mostly diastolic due to high TPR.

4. Which of the following is a differentiating feature between Grave's disease and toxic multinodular goiter?
   A. Proximal myopathy
   B. Tachycardia
   C. Cardiomyopathy
   [✓ D. Onycholysis]
   E. Tremors

A cho
pui

Ans: Onycholysis

Explanation: Signs pathagnomic to Grave's disease are: pretibial myxodema, thyroid acropachy, onycholysis and thyroid eye disease. All the other features are present in all causes of thyrotoxicosis.

(Onycholysis is present in both Grave's disease and hypothyroidism?

5. A 28 year old female from remote area who is a diagnosed case of hyperthyroidism is referred to you in tertiary care hospital for management. She is married and is having 2 children. She is non-compliant to medications. How will you manage this patient?
   [✓ A. Subtotal thyroidectomy]
   B. Carbimazole
   C. Prophylthiouracil
   D. Radioactive iodine
   E. Propranolol

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7

Ans: Subtotal thyroidectomy

Explanation: There is no absolute indication for any of the treatment modalities used for hyperthyroidism. It should be the personal decision. All patients should be treated with antithyroid medication. If there is intolerance or non-compliance with medications, then definite treatment should be given. Definite treatment is either RAI or surgery. RAI is usually used in elderly patients with small thyroid and no or inactive thyroid opthalmopathy, whereas surgery is preferred in young patients who can't attend the hospital regularly and for patients who have nodular goiter or have opthalmopathy. Radioiodine therapy is associated with higher relapse than surgery.

6. A 37 year old female is diagnosed with Graves' disease. She has opted to take carbimazole treatment. What should be the minimum duration of treatment in this patient?
   A. 3-6 months
   B. 6-12 months
   C. 12-18 months

6-9 (ATD)
12-18

D. 18-24 months
E. 24-36 months

9-12 MDR 18 24

Ans: 12- 18 months

Explanation: Antithyroid drugs are the 1st line treatment for Grave's disease, particularly in younger patients and for short-term treatment for Graves' disease before RAI therapy or thyroidectomy. The optimal duration of ATD therapy is 12-18 months. Maximum remission rates of 50-55% are achieved within 12-18 months. For children, ATD should be continued for 36 months. If using block and replace regimen, treatment duration is 6-12 months.

If there is persistent hyperthyroidism at 18 months, there are two options:

- Continue ATD for further 12 months or
- Definitive treatment with RAI or surgery.

6-9

If there is relapse after stopping ATD, definitive treatment is used or low dose ATD for lifelong is used.

7. A 47 year old female with history of papillary carcinoma of thyroid is taking levothyroxine 100mcg per day came for review. Her TSH is <0.1mU/L which was also the same 3 months back. What should be the best course of action for this lady?
   A. Repeat TSH after 6 weeks
   B. Stop levothyroxine
   C. Continue at same dose
   D. Change to liothyronine
   E. Decrease the dose to 75 microgram

TSH 0.5-5.4

2.5-3.5 Thyro

Thyroglobulin 0.5-5

Ans: Continue the same dose

Explanation: TSH is a growth factor for many thyroid cancers and it is routinely suppressed with levothyroxine. TSH and thyroglobulin are monitored in patients with history of thyroid cancer and TSH is kept suppressed to below 0.1mU/l.

8. A 39 year old female with a diagnosis of Grave's disease with poor compliance to medications presented with fever, palpitations, loose stools and confusion for 3 days. Patient is recovering from a UTI. Examination showed tachycardia, hypertension with warm and flushed skin. What treatment combination should be given?
   A. Carbimazole + propranolol
   B. PTU + propranolol+ dexamethasone
   C. Carbimazole + propranolol + dexamethasone
   D. Lugol iodine+ propranolol+ dexamethasone
   E. Paracetamol + saline infusion

Ans: PTU+ propranolol + dexamethasone

Explanation: This patient is most probably having thyroid storm which is a medical emergency. It is typically seen in patients with established thyrotoxicosis. Precipitating factors are trauma, infections, DKA, surgery, stroke, heart failure, PE and RAI treatment. PTU is preferred over carbimazole in the management of thyroid storm because it has more rapid action and it also prevents peripheral conversion of T4 to T3.

Dexamethasone is also used in treatment because it also blocks the peripheral conversion of T4 to T3. Propranolol is used to decrease the heart rate and blood pressure and it also has the action on peripheral conversion of T4 to T3. Lugol iodine is only used atleast 1-2 hours after starting PTU.

9. A 54 year old female presented with history of weight loss and sweating. Examination showed proptosis with tremors of hands. You check the TSH which is <0.1mU/l. T4 is within normal limits. What should be the next best test?
   A. MRI brain
   B. Ultrasound thyroid
   C. Thyroid isotope scan
   D. [✓ Check T3 level]
   E. Serum thyroglobulin

> 65

→ T3

Ans: Check T3 level

Explanation: In 5% of patients with thyrotoxicosis, T3 is elevated before T4. This is called T3 toxicosis. So, the best next test in this patient should be to rule out this T3 toxicosis. If T3 will be normal, the patient is said to have subclinical hyperthyroidism.

10. A 51 year old male presented with 2 days history of fever and pain in the front of neck associated with feeling anxious and nervous after a history of URTI for which patient has taken paracetamol. Examination showed fine resting tremors with fever and tachycardia. Thyroid examination showed a diffusely enlarged and tender gland. TFTs showed hyperthyroidism. What is the probable diagnosis?
    A. Graves' disease
    B. Hashimoto thyroiditis
    C. [✓ Subacute thyroiditis]
    D. Drug induced thyroiditis
    E. Destructive thyroiditis

Ans: Subacute thyroiditis

Explanation: The patient's history and examination are typical of subacute or De Quervain thyroiditis. It occurs most commonly after a viral infection and typically presents with hyperthyroidism. Four important diagnostic features are:

- Hyperthyroidism
- Painful goiter
- Raised ESR
- Globally reduced uptake on iodine scan

Treatment is NSAIDS and propranolol. ATDs are not used.

(ATDs are not used in thyroiditis i.e. subacute thyroiditis, postpartum thyroiditis)

11. A 43 year old female presented with deteriorating vision and painful eyes. On examination, patient is having proptosis, periorbital edema and a painful complex opthalmoplegia. Her TFTs showed hyperthyroidism. What would be the most appropriate next step in management?
    A. Radioactive iodine

B. Surgical decompression of orbit
C. IV methylprednisolone
[✓ D. Total thyroidectomy]
E. Artificial tear drops

Ans: IV methylprednisolone

Explanation: IV methylprednisolone is the treatment of choice for moderate to severe thyroid orbitopathy. If the response to IV steroid is poor after one to 2 weeks, surgical decompression should be offered. Supportive therapy like tear drops are used in mild disease but this patient is having symptomatic disease with decrease vision and complex opthalmoplegia. The DDs of complex opthalmoplegia is either thyroid orbitopathy or myasthenia gravis. RAI treatment should be avoided in active thyroid eye disease because it causes worsening of symptoms.

12. A 29 year old female is diagnosed as having hyperthyroidism after a work up for history of palpitations, tremors, diarrhea, and weight loss. Which of the following treatment is prescribed initially to improve the symptoms?
A. Radioactive iodine
[✓ B. Propranolol]
C. Carbimazole
D. PTU
E. Lugol iodine

240

18

Ans: Propranolol

Explanation: This patient is having hyperthyroidism, but we don't know the cause of hyperthyroidism and the question asked about the medicine to relieve the symptoms. Beta blockers are initially used in the treatment of all causes of hyperthyroidism to treat the symptoms of thyrotoxicosis like tremors, heat intolerance, sweating, palpitations and anxiety. ATDs are used in the treatment of Grave's disease but their clinical effects are delayed because the preformed hormones have high half-life.

13. A 68 year old female is referred to you by her surgeon after an abnormal thyroid hormone test which showed very low TSH and normal free T4 and T3. What is the diagnosis?
A. Grave's disease
B. Secondary hyperthyroidism
C. Tertiary hyperthyroidism
[✓ D. Subclinical hyperthyroidism]
E. Secondary hypothyroidism

16

Ans: Subclinical hyperthyroidism

Explanation: Suppressed TSH with normal T4 and T3 is called subclinical hyperthyroidism. Treatment is indicated if it is associated with atrial fibrillation or there is high CV risk and in patients with osteoporosis or high risk of osteoporosis.

14. A 34 year old female who presented with history of weight loss and palpitations is diagnosed as having Grave's disease with very low TSH and high free T4 and T3 with high level of TSH receptor antibodies. Doppler scan showed increased blood flow to thyroid. Thyroid iodine scan showed

diffuse uptake of iodine. She is started on carbimazole 30 mg once daily. How will you monitor her response to treatment?

A. TSH
B. FT4, FT3
C. TSH receptor antibodies
D. Thyroid Ultrasound
E. Iodine scan

Ans: FT4 and FT3

Explanation: FT4 and FT3 are used in the monitoring of Grave's disease after starting ATDs. TSH remains suppressed for prolonged time in thyrotoxicosis and is not used initially in the monitoring. FT3 and T4 are monitored every 4-6 weeks to check the response and compliance of ATD and for titration of dose. TSH receptor antibodies and imaging studies are used in diagnosis and there is no role in monitoring of the treatment response.

Patterns observed in radioactive iodine uptake and scan:

Condition	Radioactive iodine uptake (Normal 15-25%)	Radiotracer distribution within the thyroid gland
Grave's disease	High	Homogeneous
Toxic adenoma	High	Radiotracer concentrated in one spot with reduced uptake elsewhere
Toxic MNG	High	Multiple spots with high uptake with reduced uptake elsewhere
Thyroiditis	Low	Diffusely low uptake

MS

15. A 27 year old female with a diagnosis of Grave's disease on carbimazole titration regimen is came for your advice as she wants to conceive. Her latest TSH is <0.1 and T3 and T4 are also slightly on higher side. What will be your advice to her? 6-9 12-18

A. She can take carbimazole throughout the pregnancy
B. Titration regimen should be changed to block and replace regimen in pregnancy
C. Pregnancy should be delayed until euthyroidism achieved
D. Radioactive iodine can be given in 2nd trimester
E. Carbimazole is better than PTU in 1st trimester

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Ans: Pregnancy should be delayed until euthyroidism achieved

Explanation: Pregnancy should be postponed if hyperthyroidism is inadequately controlled until euthyroidism is achieved and confirmed on 2 occasions two months apart on stable therapeutic regimen. Block and replace regimen is contraindicated in pregnancy because thyroxine does not cross placenta and ATD can cause fetal hypothyroidism. Carbimazole should be stopped in 1st trimester and started after 16 weeks gestation. In 1st trimester, PTU should be used. RAI therapy is contraindicated in pregnancy and pregnancy should be avoided for 6 months after RAI treatment by using two different methods of contraception.

16. A 27 year old female who is 8 weeks pregnant is referred to you by gynecologist for excessive vomiting, sweating, palpitations and heat intolerance. Her TFTs showed TSH 0.001 mU/l, FT4 62.2 pmol/l (9.8-23.1) and FT3 24.4(3.5-6.5). What is the best recommended management for her?
    - A. Carbimazole throughout pregnancy
    - B. PTU up to 16 weeks then shift to carbimazole
    - C. Propranolol throughout pregnancy only
    - [✓ D. PTU throughout the pregnancy]
    - E. Carbimazole up to 16 weeks then shift to PTU

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3-9

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1.5u [illegible]

Ans: PTU up to 16 weeks then shift to carbimazole

Explanation: Establishing the diagnosis of Graves hyperthyroidism early, maintaining euthyroidism and achieving a serum total T4 in the upper limit of normal throughout pregnancy is key to reduce the risk of maternal, fetal and newborn complications. ATDs remain the treatment of choice for Graves' disease during pregnancy. The lowest dose of ATD needed to maintain T4 1.5 times the upper limit of the non-pregnant reference range should be used. In the first trimester, PTU can be dosed at 50-150 mg every 8 hours depending on the severity of patient's symptomology. After 16 weeks, PTU should be changed to carbimazole as a single dose. Propranolol can be used initially to control hyperadrenergic symptoms but should be discontinued after symptoms get better because long-term treatment has been associated with poor intrauterine growth, fetal bradycardia and neonatal hypoglycemia. TSH receptor antibodies should be checked at 18-22 weeks of gestation and if elevated should be checked again at 28-34 weeks. Maternal TSH receptor antibodies greater than 3 times the ULN in 3rd trimester is a risk factor for neonatal hyperthyroidism.

PTU

17. A 14 weeks pregnant female is diagnosed as having Grave's disease is started on PTU 100 mg three times daily. Patient came back with complains of ~~feeling~~ nausea and severe pruritus after taking medications. She don't want to take medications. What will be your next best management step?
    - A. Radioactive iodine low dose
    - B. Low dose propranolol only
    - C. Thyroidectomy in 1st trimester
    - D. Thyroidectomy in 2nd trimester ✓
    - E. Thyroidectomy in 3rd trimester

Ans: Thyroidectomy in 2nd trimester

Explanation: Thyroidectomy in the second trimester is an effective option if a woman is unable to tolerate ATD, non-consistent with drug therapy, requiring very high doses of ATDs, has a large goiter or allergic to ATD. Radioactive iodine is absolutely contraindicated.

18. A 37 year female is using carbimazole 30 mg once daily for Grave's disease presented with history of fever with sore throat for 1 week not getting better with supportive treatment. Which of the following is the best next step in management?
    - A. Check TSH
    - B. Check T3 and T4
    - C. Check CBC ✓
    - D. Do blood culture

E. Check LFTs

Ans: Check CBC

Explanation: In patients taking carbimazole, a differential white blood cell count should be obtained during febrile illness and liver function should be assessed in those who experienced jaundice, light colored stools or dark urine. Every patient who is started on ATD should be given written instructions regarding the symptoms of agranulocytosis and the need to stop medications pending a CBC result. The agranulocytosis is abrupt in onset, so there is no need to monitor CBC regularly and should only be done if patient is symptomatic.

Agranulocytosis is a rare adverse effect of ATD and hepatitis is a very rare side effect of PTU.

19. A 34 year old female, who is pregnant, is diagnosed as having hyperthyroidism on screening before delivery. She is 36 weeks pregnant and complains of palpitations at night time. What will be your recommendations for treatment in this patient?
    - A. Start PTU only
    - B. Start carbimazole only
    - C. [✓ Start propranolol only]
    - D. Propranolol + PTU
    - E. Propranolol + carbimazole

34

Ans: Start propranolol only

Explanation: ATD should be stopped if already taking at 34 weeks of gestation and propranolol should be given to decrease the risk of fetal hypothyroidism. If patient is diagnosed after 34 weeks of gestation, propranolol can be used for symptoms control, if mild to moderate elevation of thyroid hormones is present.

3

20. A 31 year old patient is commenced on carbimazole for hyperthyroidism. How often should her TFTs be measured for dose alteration?
    - A. 2 monthly
    - B. [✓ 4-6 weekly]
    - C. 8-12 weekly
    - D. 6 monthly
    - E. 2-4 weekly

STEMI

3 weeks

6 8-12

Ans: 4-6 weekly

Explanation: After starting ATD, T3 and T4 should be monitored 4-6 weekly interval for titration of the dose.

21. A 25 year old female, who is a diagnosed case of Grave's disease on treatment, came for review as she wants to conceive. You ordered some tests which showed euthyroidism but TSH receptor antibodies are positive. What advice you will give to her?
    - A. High risk of thyroid storm during pregnancy
    - B. Increased risk of heart failure during pregnancy
    - C. Increased risk of pre eclampsia
    - D. Increased risk of fetal hyperthyroidism

TSI

E. High risk of atrial fibrillation

Ans: Increase risk of fetal hyperthyroidism

Explanation: The presence of TSH receptor antibodies increased the risk of fetal hyperthyroidism and spontaneous abortion, if present in pregnant female.

22. Which of the following HLA subtype is associated with the Grave's disease?

A. HLA DR5
B. HLA DR3 ✓
C. HLA DQ2
D. HLA B27
E. HLA Cw

Ans: HLA DR3

Explanation: HLA DR3 is associated with Graves' disease.

23. A 45 year old male presented with a hard and fixed, painless woody goitre. She is having some difficulty with swallowing. She is otherwise asymptomatic. A thyroid ultrasound is performed and reveals a homogeneously hypoechoic gland. She is euthyroid. A biopsy is organised which revealed dense infiltration. What is the most likely diagnosis?

A. Hashimoto thyroiditis
B. De Quervain thyroiditis
C. Atrophic thyroiditis ✓
D. Riedal thyroiditis
E. Anaplastic carcinoma

Ans: Riedal thyroiditis

Explanation: Riedel's thyroiditis (RT), is a rare, chronic inflammatory disease of the thyroid gland characterized by a dense fibrosis that replaces normal thyroid parenchyma. The fibrotic process invades adjacent structures of the neck and extends beyond the thyroid capsule. This feature differentiates RT from other inflammatory or fibrotic disorders of the thyroid. Extension beyond the thyroid also differentiates this from the fibrosing variant of Hashimoto thyroiditis. Patients typically present with a hard, fixed, painless goiter. The character of the thyroid gland is often described as stony or woody. The onset of the goiter may be sudden, but it is usually gradual. Thyroid ultrasonography has been reported to be homogeneously hypoechoic, with loss of clear demarcation of the gland when fibrotic invasion of adjacent anatomic structures exists.

24. A 67 year old female came with a large multinodular goitre. TFTs were done which showed undetectable TSH with very high T3 and T4 level. Thyroid scan showed increased uptake in multiple nodules with absent uptake in surrounding tissues. Which of the following is the definite treatment for her?

A. Thyroidectomy
B. Carbimazole
C. Prophylthiouracil
D. Radioactive iodine ✓

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E. Lugol iodine

Ans: Radioactive iodine

Explanation: This patient is having toxic multinodular goitre for which radioactive iodine is the definitive treatment. Higher dose of iodine can be administered than Grave's disease due to decrease uptake in normal parenchyma. Surgery is indicated in case of very large goitre causing compressive symptoms. Long term treatment with ATD is not advisable because of the high risk of relapse. RAI is also the treatment of choice for toxic adenoma.

25. A 57 year old male is taking amiodarone for atrial fibrillation associated with heart failure presented with tremors and excess sweating with worsening of the heart failure for 2 weeks. Labs were done which showed TSH < 0.1 with high T3 and T4. What should be the next best step in management?

    A. Stop amiodarone
    B. Start carbimazole ✓
    C. Start prednisone ✓
    D. Strat carbimazole and prednisone
    E. Start potassium perchlorate

    AIH

    Ans: Start carbimazole and prednisone

    Explanation: This is a case of amiodarone associated hyperthyroidism. There are two types of amiodarone associated hyperthyroidism. ✓

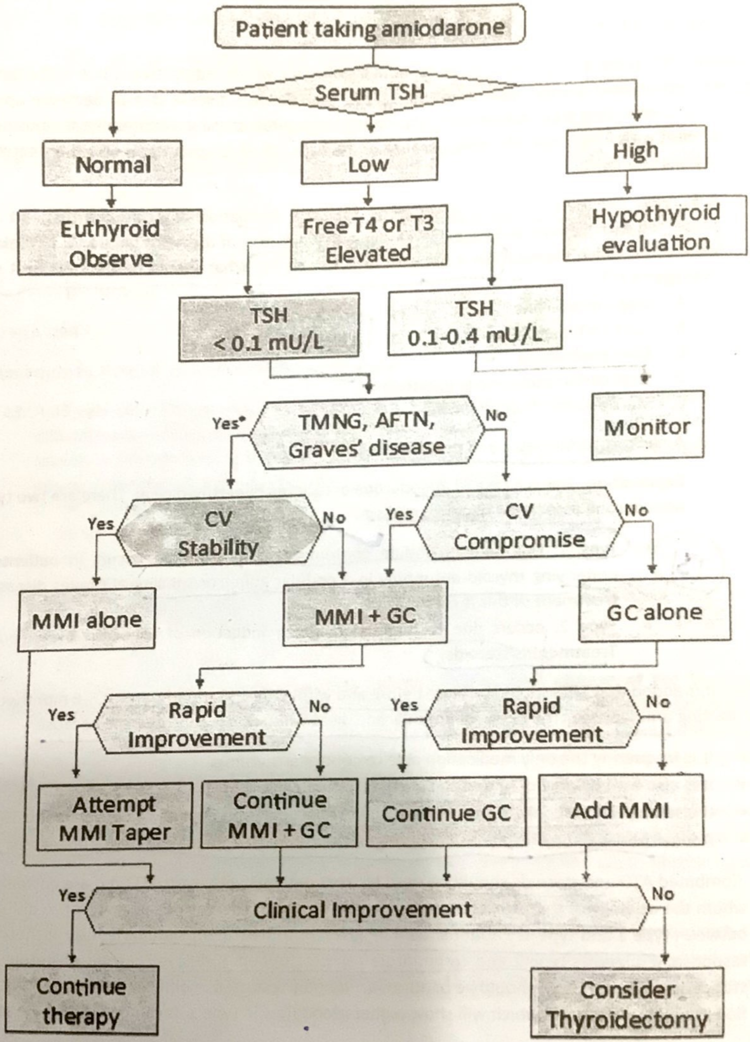
    TSI

    - Type 1: Due to high iodine content of amiodarone, it occurs in patients with underlying thyroid autonomy in a nodular goiter or subclinical Graves disease. The treatment of this is carbimazole
    - Type 2: occurs due to direct damage or induction of apoptosis by amiodarone. Treatment is steroids.

It is recommended that TFTs should be done before and within the 1st 3 months and at 3-6 months interval after starting amiodarone. The need for amiodarone discontinuation is controversial because

- It is frequently the only medication able to control arrhythmia
- It is also a fat soluble drug and can persists for many months.
- It also has T3 antagonistic properties at the cardiac level and inhibits T4 conversion to T3
- And withdrawal may results in worsening of the cardiac manifestation of thyrotoxicosis.

Combined ATD and steroids should be used to treat patients with overt AIT who are unstable and in whom the etiology of thyrotoxicosis cannot be determined. There is no specific test to differentiate between type 1 and type 2. Patient should be given both treatment simultaneously, if there is early response, it suggests type 2 and carbimazole can be stopped. If delayed response, steroids can be stopped and carbimazole should be continued. The only test used in differentiating these two is color flow Doppler ultrasound which will show higher blood flow in type 1. It can be used where available.


Patient taking amiodarone
Serum TSH
Normal
Low
High
Euthyroid Observe
Free T4 or T3 Elevated
Hypothyroid evaluation
TSH < 0.1 mU/L
TSH 0.1-0.4 mU/L
Monitor
Yes*
TMNG, AFTN, Graves' disease
No
Yes
CV Stability
No
Yes
CV Compromise
No
MMI alone
MMI + GC
GC alone
Yes
Rapid Improvement
No
Yes
Rapid Improvement
No
Attempt MMI Taper
Continue MMI + GC
Continue GC
Add MMI
Yes
Clinical Improvement
No
Continue therapy
Consider Thyroidectomy

* Based on clinical history, TRAb, Doppler flow, ultrasound, ± RAIU
MMI, methamizole, GC, glucocorticoids

26. A 24 year old female came for review of labs done for weight gain which showed slightly low TSH with high T3 and T4 levels. Free T3 and T4 are done which came to be within normal range. What is the probable cause of this derangement?
   - A. Grave's disease
   - B. Sick euthyroid syndrome
   - C. Hypothyroidism
   - D. Pregnancy
   - E. Sub Acute thyroiditis

TBG↑

Ans: Pregnancy

Explanation: TSH is suppressed in early pregnancy due to stimulation of TSH receptor by HCG. In pregnancy, thyroid binding globulins are increased which cause increased total T4 and T3 with normal free T4 and T3.

27. A 34 year old female patient is referred to you by her obstetrician for management of her hypothyroidism. She is taking levothyroxine 100 microgram daily and her TSH is 3.1 mU/l. What should be your recommendations for her?
   - A. Reduce the dose to 75 microgram
   - B. Increase the dose to 200 microgram
   - C. Increase the dose to 150 microgram
   - D. Reduce the dose to 50 microgram
   - E. Continue the same dose

0.5–5.

↓

TSH 3.1

Ans: Increase the dose to 150 microgram

Explanation: During pregnancy, levothyroxine dose should be increased by 50% with a goal TSH less than 2.5 during the 1st trimester and less than 3 during the 2nd and 3rd trimester.

28. A 26 year old female is evaluated for infertility has following blood test results. TSH 10.2mU/l, FT4 13.8 (8.5-15) and FT3 5.6 (3.5-6.5). What is the diagnosis?
   - A. Overt hypothyroidism
   - B. Subclinical hypothyroidism
   - C. Over hyperthyroidism
   - D. Subclinical hyperthyroidism
   - E. Secondary hyperthyroidism

Ans: Subclinical hypothyroidism

Explanation: High TSH with normal FT4 and FT3 suggest the diagnosis of subclinical hypothyroidism. Levothyroxine treatment is recommended when TSH is > 10 or for a female who wishes to conceive or is pregnant. It should also be treated if patient is having hyperlipidemia and positive anti TPO antibodies.

29. Which of the following is the most common skin manifestation of hypothyroidism?
   - A. Alopecia
   - B. Dry skin
   - C. Myxedema
   - D. Dry, [illegible] skin

E. Yellow skin

Ans: Dry skin

Explanation: The most common skin manifestation of hypothyroidism is coarse, rough, dry skin seen in 70-90% of the patients, followed by pallor of skin, with carotenemia seen in 52% of the patients, nail changes in 38.9% of the patients, diffuse hair loss in 33.3% of the patients, palmoplantar keratoderma in 33.3% of the patients, and loss of a lateral third of the eyebrows in 22.2% of the patients.

30. A 25 year old female is diagnosed as having hypothyroidism on laboratory testing which showed high TSH and low T4 and T3. Which of the following is the next best test to evaluate the cause of hypothyroidism in this patient?
    - A. Thyroid ultrasound
    - B. Radioisotope scan
    - C. Anti TPO antibodies ✓ ✓
    - D. Anti TSH receptor antibodies
    - E. FNAC of thyroid

Ans: Anti TPO antibodies

Explanation: Once clinical or subclinical hypothyroidism is confirmed, the etiology is usually established by demonstrating the presence of anti TPO antibodies which are present in more than 90% of patients with autoimmune hypothyroidism. Autoimmune hypothyroidism is the most common cause of hypothyroidism. FNAC biopsy can also be used but noninvasive tests should be done before invasive tests.

31. A 37 year old female is diagnosed as having hypothyroidism due to Hashimoto thyroiditis. Which of the following is not associated with hypothyroidism?
    - A. Hyperlipidemia ✓
    - B. Hyponatremia ✓
    - C. High prolactin ✓
    - D. Microcytic anemia ✓ ✗
    - E. Macrocytic anemia

VIII FIII XVII

Ans: Microcytic anemia

Explanation: Abnormal laboratory findings in hypothyroidism include high CPK, hyponatremia, normocytic or macrocytic anemia, hyperprolactinemia and hyperlipidemia. Presence of microcytic anemia in hypothyroidism should raise suspicion of the concurrent celiac disease.

32. A 32 year old female is taking levothyroxine 250 micrograms daily for 3 months but she still complains of hypothyroidism symptoms. Her TFTs also showed high TSH level with low T3 and low normal T4. Which of the following can be the most important cause of levothyroxine failure in this patient?
    - A. Celiac disease
    - B. Pernicious anemia
    - C. Poor adherence ✓
    - D. Thyroid hormone resistance syndrome
    - E. Autoimmune Hepatitis

apbb + VIII

Ans: Poor adherence

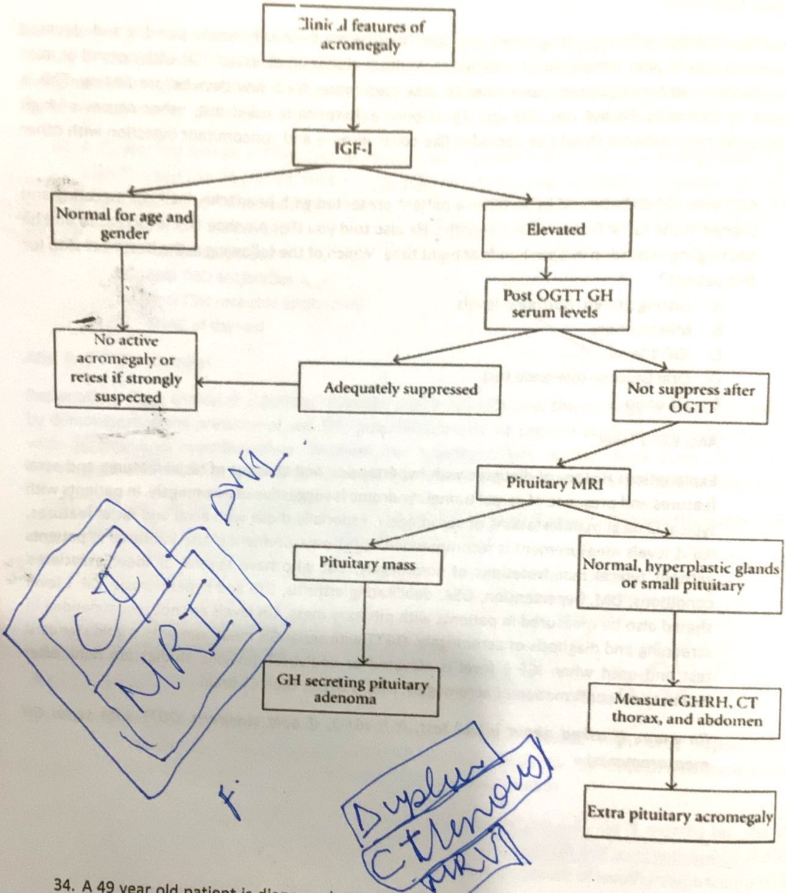
Explanation: Patients who are taking more than 200 micro gram of levothyroxine per day and elevated TSH level is a sign of poor adherence to treatment. Another clue is an elevated TSH with normal or near normal T4, because these patients remember to take medication for a few days before testing. This is sufficient to normalize T4 but not TSH and T3. If poor adherence is ruled out, other causes of high levothyroxine requirements should be excluded like celiac disease and concomitant ingestion with other drugs.

33. A 51 year old diabetic and hypertensive patient presented with headache, increase sweating and change in the facial features for 6 months. He also told you that his shoe size is increased and he has tingling sensation in both hands at night time. Which of the following is the best next step for this patient?
    - A. Fasting growth hormone levels
    - B. MRI pituitary
    - C. IGF-1 level
    - D. Oral Glucose tolerance test
    - E. CT brain

Ans: IGF-1 level

Explanation: History of diabetes with hypertension and changes of facial features and acral features and presence of carpal tunnel syndrome is suggestive of acromegaly. In patients with typical clinical manifestations of acromegaly, especially those with acral and facial features, IGF-1 levels measurement is recommended. IGF-1 measurement is also indicated in patients without typical manifestations of acromegaly, but who have several of these associated conditions; DM, hypertension, OSA, debilitating arthritis, CTS and hyperhidrosis. IGF 1 level should also be measured in patients with pituitary mass. GH levels are not recommended in screening and diagnosis of acromegaly. OGTT with serial GH measurements is gold standard test and used when IGF 1 level is elevated or equivocal. Imaging studies are done after biochemical confirmation of acromegaly. MRI is better than CT brain.

(In exam, if asked about initial test, it is IGF-1, if gold standard, OGTT with serial GH measurements).


Clinical features of acromegaly
IGF-I
Normal for age and gender
Elevated
Post OGTT GH serum levels
No active acromegaly or retest if strongly suspected
Adequately suppressed
Not suppress after OGTT
Pituitary MRI
Pituitary mass
Normal, hyperplastic glands or small pituitary
GH secreting pituitary adenoma
Measure GHRH, CT thorax, and abdomen
Extra pituitary acromegaly
DWI
CT
MRI
F
Duplex
CT venous
MRV

34. A 49 year old patient is diagnosed as a case of acromegaly after a pituitary mass is detected on MRI done for persistent headache. Which of the following investigation should be done in this patient other than the investigation for diagnosis of acromegaly?

A. Upper GI endoscopy
B. CA 19-9 level
C. Sleep studies
D. Colonoscopy

E. Nerve conduction studies

Ans: Colonoscopy

Explanation: Patients with acromegaly should be offered regular colonoscopic screening, starting at the age of 40 years. The frequency of repeat colonoscopy should depend on the findings at the original screening and the activity of the underlying acromegaly. Patients with an adenoma at first screening or increased serum IGF-1 level above the maximum of the age corrected normal range should be offered screening at three year intervals. Patients with either a negative first colonoscopy or a hyperplastic polyp should be offered screening at five year intervals. Although patients with acromegaly has OSA but sleep studies are not recommended in all patients.

35. Which of the following is the best initial treatment option for a patient recently diagnosed with acromegaly?
    - A. Bromocriptine
    - B. Carbergoline
    - [✓ C. Transsphenoidal surgery]
    - D. Octreotide
    - E. Radiotherapy

Ans: Transsphenoidal surgery

Explanation: Transsphenoidal surgery is the primary and preferred therapy in most patients of acromegaly. Successful surgery produces immediate lowering of GH levels and provides tumor tissue for pathological characterization. It results in > 85% initial remission rate for micro adenomas and 40-50% for macro adenoma.

36. A patient with acromegaly has transsphenoidal surgery done for macroadenoma of pituitary. Patient is recovering well with no complication of surgery. When should the follow up MRI be done for assessment?
    - A. 4 weeks
    - B. 6 weeks
    - C. 8 weeks
    - D. 10 weeks
    - E. 12 weeks

Ans: 12 weeks

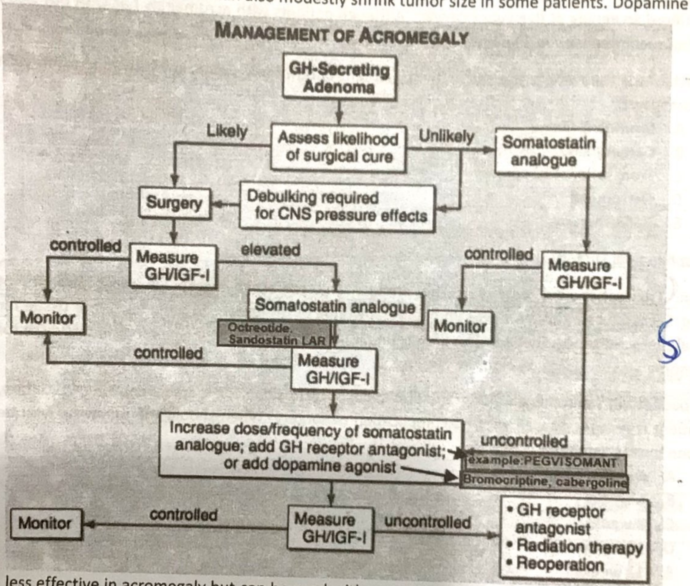
Explanation: Postoperative imaging should be performed no sooner than 12 weeks after surgery to allow for involution of gel foam and fat packing. IGF 1 and random GH level should also be measured at 12 weeks post-surgery.

37. A 52 year old male is diagnosed as a case of acromegaly. He is offered surgery but refused the surgery because of the risk of complications. What would you advise him as alternative to surgery initially?
    - A. Bromocriptine
    - B. Carbergoline
    - C. Octreotide

D. Pegvisomant
E. Radiotherapy

Ans: Octreotide

Explanation: In patients who refused surgery, somatostatin receptor analogues such as octreotide or lanreotide can be used initially. Long acting preparation are used in acromegaly which are injected monthly. Symptoms of acromegaly like arthralgia, sweating, soft tissue swelling and headache frequently improve with octreotide. It can also modestly shrink tumor size in some patients. Dopamine agonists are less effective in acromegaly but can be used with associated hyperprolactinemia. Pegvisomant is used if somatostatin analogue fail to suppress GH and IGF 1.


MANAGEMENT OF ACROMEGALY
GH-Secreting Adenoma
Likely
Assess likelihood of surgical cure
Unlikely
Somatostatin analogue
Surgery
Debulking required for CNS pressure effects
controlled
Measure GH/IGF-I
elevated
controlled
Measure GH/IGF-I
Monitor
Somatostatin analogue
Octreotide, Sandostatin LAR
Monitor
controlled
Measure GH/IGF-I
Increase dose/frequency of somatostatin analogue; add GH receptor antagonist; or add dopamine agonist
uncontrolled
example:PEGVISOMANT
Bromocriptine, cabergoline
Monitor
controlled
Measure GH/IGF-I
uncontrolled
• GH receptor antagonist
• Radiation therapy
• Reoperation

S

38. A 56 year old female patient who is a diagnosed case of acromegaly is started on Octreotide LAR 40 mg monthly injection. Which of the following information is most important to provide to this patient regarding treatment with octreotide?

A. Ursodeoxycholic acid should be used to prevent gall stones
B. Multivitamin should be used
C. Diabetes will gets worsened with treatment
D. GI side effects will subside within 2 weeks
E. Ultrasound should be done every 2 months to see gallstones

Ans: GI side effects will subside within 2 weeks

Explanation: GI side effects like abdominal cramps, flatulence and diarrhea are the most common side effects of octreotide treatment. Patient should be informed that these side effects usually abate 10-14 days after treatment. Gallbladder stones and sludge occurs in 25% of patients and are asymptomatic. Ultrasound monitoring and concomitant use of ursodeoxycholic acid is not recommended. USG is done only in symptomatic patients. Octreotide inhibits release of both insulin and glucagon as well as GH, so glucose control usually improves with treatment.

39. A 49 year old female presented with weight gain, reduced libido and headache. She also complains of galactorrhea. Examination showed hyperpigmentation with abdominal striae and bitemporal hemianopia. Which of the following investigation will reveal the underlying diagnosis?

A. Low dose dexamethasone suppression test
B. High dose dexamethasone suppression test
C. Serum prolactin level
[✓ D. MRI pituitary]
E. 24 hour urinary cortisol

Ans: MRI pituitary

Explanation: The history and examination suggests Cushing disease but the presence of headache, galactorrhea and bitemporal hemianopia also suggests the presence of prolactinoma. The best test in this patient should be a pituitary MRI to diagnose the pituitary mass causing secretion of ACTH and prolactin.

40. A patient is diagnosed case of acromegaly came for review. You have examined the patient. Which of the following clinical sign may be present in this patient?

A. Homonymous hemianopia
B. Overbite
C. Reduced FVC on spirometry
[✓ D. Positive tinel sign]
E. Hyperpigmentation

Ans: Positive Tinel sign

Explanation: Positive Tinel sign indicates the presence of carpal tunnel syndrome and it can be present in patients with acromegaly. Visual field defect associated with acromegaly is bitemporal hemianopia not homonymous hemianopia. Under biting occurs due to proganthism. FVC is slightly increased in acromegaly. Hyperpigmentation occurs when ACTH is over secreted.

41. A 26 year old female is investigated for Infertility for 2 years. She complains of irregular and scanty periods with milky white breast discharge. Labs showed serum prolactin of 6500 (N < 500). Pituitary MRI showed a microadenoma. Which of the following is the best initial treatment?

A. Transsphenoidal surgery
B. Octreotide
C. Bromocriptine
D. Radiotherapy
E. Levothyroxine

Ans: Bromocriptine

Explanation: This patient is having prolactinoma and the 1st line treatment for prolactinoma is dopamine agonists like bromocriptine or carbergoline. DAs inhibit the release of prolactin from the gland and improves the symptoms of galactorrhea and oligomenorrhea. Surgery is reserved for patients who have compressive symptoms or who failed the initial drug treatment.

42. A 43 year old male with a history of resection of pituitary tumor 3 years back presented with complaints of feeling tired all the times with weight gain and poor concentration. He is taking prednisone 10 mg in morning and 2.5 mg in evening and levothyroxine 150 daily. Labs were done which showed TSH < 0.001, FT4 normal, cortisol normal. What is the most appropriate treatment for this patient?
    - A. Reduce levothyroxine NO
    - B. Reduce prednisone
    - C. Increase prednisone
    - D. Increase levothyroxine
    - [✓ E. Start growth hormone]

Ans: Start growth hormone

Explanation: This patient is having panhypopituitarism after surgery and he is receiving adequate replacement of thyroid and glucocorticoids. In panhypopituitarism, TSH will be very low and monitoring is done by FT4 level which is adequate in this patient. Growth hormone should be given to patients with symptoms of growth hormone deficiency which are fatigue, weight gain and poor concentration. IGF 1 level should be checked.

43. A 41 year old female presented with history of weakness, fatigue and dizziness for 1 year. She also complains of amenorrhea for 5 years after the birth of last child which leads to severe postpartum hemorrhage managed by uterine artery embolization. Labs were done which showed low TSH, low T3 and T4 with very low FSH and LH. What is the most probable diagnosis?
    - A. Hashimoto thyroiditis
    - B. Secondary hypothyroidism
    - [✓ C. Sheehan syndrome]
    - D. Addison disease
    - E. Langerhans cell histiocytosis

MR

MS

Ans: Sheehan syndrome

Explanation: History of postpartum hemorrhage with panhypopituitarism is typical of Sheehan syndrome.

44. A 21 year old male is investigated for Infertility has following lab tests: LH low, FSH low, testosterone low. TSH normal. Patient also complains of poor sense of smell since the childhood which was supposed to be related to allergic rhinitis as said by his ENT surgeon. What is the probable diagnosis?
    - A. Prader Willi syndrome
    - [✓ B. Kallmann syndrome]
    - C. Klinfilter syndrome
    - D. Sheehan syndrome

E. Turner syndrome

Ans: Kallmann syndrome

Explanation: Kallmann syndrome is characterized by hypogonadotropic hypogonadism with loss of olfaction. It is caused by gene mutation that impairs the development or migration of GnRH synthesizing neurons from the olfactory bulb to the hypothalamus. Classically, the syndrome is associated with color blindness, optic atrophy, nerve deafness, cleft palate, renal abnormalities, cryptorchidism, and mirror movements like CNS abnormalities. Long term treatment with HCG and testosterone is used.

45. A 17 year old boy is referred to you due to obesity and poor development of secondary sexual characters. He is also under treatment from an eye specialist for loss of color vision. Examination showed small fingers and 6 fingers of both hands and feet. Labs were done which showed low FSH, low LH and low testosterone levels. Ultrasound abdomen showed cysts in both kidneys. What is the most probable diagnosis?
    A. Klinfilter syndrome
    B. Bardet Biedl syndrome
    C. Usher syndrome
    D. Kallmann syndrome
    E. Prader Willi syndrome

Ans: Bardet Biedl syndrome

Explanation: Laurence-Moon-Bardet-Biedl syndrome (LMBBS) is a rare autosomal recessive (AR) disorder. It is characterized predominantly by hypogonadism, polydactyly, retinitis pigmentosa, obesity, and mental retardation. Renal abnormalities like polycystic kidney disease also develops early and is the most common cause of death in these patients. Patients become blind by the age of 30.

46. A 45 year old female is presented with complains of generalized muscular weakness and weight gain. Examination showed central obesity with moon shaped face and abdominal striae. 24 hour urinary free cortisol is high and serum ACTH is also high. MRI brain showed a macroadenoma. What is the treatment of choice for this patient?
    A. Ketoconazole
    B. Metyropone
    C. Transsphenoidal surgery
    D. Pasireotide
    E. Radiotherapy

Ans: Transsphenoidal surgery

Explanation: This patient with typical symptoms of Cushing syndrome with high urinary free cortisol and high ACTH suggests ACTH dependent Cushing disease. MRI brain showed a macroadenoma which is most probably secreting ACTH. Transsphenoidal surgery is the treatment of choice for Cushing disease. Cushing disease is the most common cause of endogenous hypercortisolism and accounts for 70% of cases. Ketoconazole and pasireotide are used when there is persistent hypercortisolism after surgery.

47. Which of the following features suggest Ectopic ACTH secretion rather than ACTH secreting pituitary tumor?

- A. More common in female
- [✓ B. Rapid onset of pigmentation]
- C. Non suppression of cortisol by low dose dexamethasone
- D. Suppression by high dose dexamethasone
- E. Presence of buffalo hump

Ans: Rapid onset of pigmentation

Explanation: Ectopic ACTH secretion is characterized by rapid onset of hyperpigmentation and proximal myopathy with the presence of hypokalemia and hypertension. Ectopic ACTH is more common in males whereas Cushing disease is more common in female. Low dose dexamethasone test is unable to suppress cortisol in both Cushing disease and ectopic ACTH production but in Cushing disease, cortisol is suppressed by high dose dexamethasone test. Ectopic ACTH does not suppress with high dose dexamethasone. Other signs of hypercortisolism are not seen in ectopic ACTH production because it is a rapid process and there is less time for the development of these signs which occurs mostly in Cushing disease.

48. Which of the following is the most common cause of ACTH independent Cushing syndrome?
    - A. Adrenocortical adenoma
    - [✓ B. Adrenocortical carcinoma]
    - C. Adrenal hyperplasia
    - D. Primary pigmented nodular disease
    - E. McCune Albright syndrome

Ans: Adrenocortical adenoma

Explanation: Most common cause of Cushing syndrome => exogenous steroid intake

Most common cause of endogenous hypercortisolism=> Cushing disease by pituitary microadenoma.

Most common cause of ACTH independent Cushing=> adrenocortical adenoma

49. A patient with Cushing disease has a transsphenoidal resection of the macroadenoma secreting ACTH. After surgery there was persistent hypercortisolism despite treatment with different drugs. Patient is advised bilateral adrenalectomy for further treatment of hypercortisolism. Which of the following is a common risk of bilateral adrenalectomy?
    - A. Malignant Hypertension
    - B. Uncontrolled DM
    - C. Nelson syndrome
    - [✓ D. Sheehan syndrome]
    - E. Pituitary apoplexy

Ans: Nelson syndrome

Explanation: Bilateral adrenalectomy in the setting of residual corticotrope adenoma predisposes to the development of Nelson syndrome. Almost all cases of Nelson syndrome follow bilateral adrenalectomy in patients who have Cushing disease due to an ACTH-secreting pituitary adenoma. Following bilateral adrenalectomy and normalization of cortisol levels that had suppressed hypothalamic CRH production, an increase in CRH occurs, which then has a trophic effect on the tumor, stimulating its growth. It is characterized by rapid pituitary tumor enlargement and increased pigmentation of skin secondary to high

ACTH levels. Treatment is octreotide, radiation and surgery. Prophylactic radiation therapy should be used to prevent this after adrenalectomy.

50. A 47 year old female presented with complaints of weight gain, excessive facial hair, easy bruisbility and polyuria for 9 months. Examination showed buffalo hump, broad pinkish abdominal striae and proximal myopathy. What should be the best initial test for her to confirm the diagnosis?
    A. Random serum cortisol
    B. Plasma ACTH
    C. Urinary 17 ketosteroids
    D. Low dose dexamethasone suppression test
    E. High dose dexamethasone suppression test

Ans: Low dose dexamethasone suppression test

Explanation: The symptoms and signs are suggestive of the presence of Cushing syndrome. Common features that best discriminate Cushing syndrome are easy bruising, facial plethora, proximal myopathy, >1cm reddish purple striae. For initial testing of Cushing syndrome, one of the following tests can be used;

- 24 hour urine free cortisol (atleast 2 measurements)
- Late night salivary cortisol
- Overnight or low dose dexamethasone suppression test.

Overnight or low dose dexamethasone suppression test has the highest sensitivity and specificity.(If all the above options are present in question, mark low dose dexamethasone suppression test). In pregnancy, 24 hours urinary cortisol is used. In CKD, DST is the only test recommended. For cyclic Cushing, urinary free cortisol is recommended. Diagnostic criteria that suggest Cushing are urinary free cortisol greater than the normal range, serum cortisol > 1.8 microgram (50nmol/l) after 1 mg dexamethasone and late night salivary cortisol > 145 ng/dl.

51. A 42 year old female presented to you with muscle weakness and difficulty rising from the chair. You examined the patient and noted moon face, proximal myopathy, abdominal striae and thin skin. Which of the following is the most important in the history of the patient that must be asked about?
    A. History of smoking
    B. Morning headache
    C. Use of steroids
    D. History of cough
    E. History of surgery

Ans: Use of steroids

Explanation: Exogenous glucocorticoids intake is the most common cause of Cushing syndrome and the history of prescription or without prescription steroid use should be sought in all patients.

52. A patient of Cushing syndrome has baseline Laboratory tests done in the emergency. Which of the following is not a characteristic blood test abnormality in Cushing syndrome?
    A. Hypokalemia

B. Leucocytosis
C. Lymphopenia
D. Eosinophilia ✓
E. Alkalosis

Ly Leuk · lympo

Ans: Eosinophilia

Explanation: Common laboratory abnormalities of Cushing syndrome are leukocytosis, lymphopenia and eisonopenia. Electrolytes abnormalities are hypokalemia with metabolic alkalosis.

53. A 55 year old female is investigated for having early onset Osteoporosis and abdominal striae with low dose dexamethasone suppression test. Serum cortisol is 70 nmol/l after giving 1 mg dexamethasone at 2300 hours. Which of the following should be the next best test to determine the cause of abnormal result?
    A. High dose dexamethasone suppression test
    B. Plasma ACTH level
    C. MRI brain
    D. Urinary 17 ketosteroids
    E. Inferior petrosal sinus sampling

low dose ↓ ACTH ↓ high dose ✓ ⇓

Ans: Plasma ACTH level

Explanation: High cortisol (> 50 nmol/l) after a low dose overnight dexamethasone suppression test in a patient with features suggestive of Cushing syndrome confirms the diagnosis of Cushing syndrome. Once the presence of Cushing syndrome is confirmed, measurement of plasma ACTH is the key to establish differential diagnosis. If plasma level is > 3.3 pmol/l it suggests ACTH dependent Cushing and if it is less than 1.1 it suggests ACTH independent Cushing syndrome. Inferior petrosal sinus sampling is the best test for confirmation of Cushing disease due to pituitary adenoma. High dose dexamethasone test is used to differentiate between Cushing disease and ectopic ACTH secretion.

54. Which of the following is the most common cause of death in Cushing syndrome?
    A. Sepsis
    B. Renal failure
    C. Respiratory failure
    D. Ischemic heart disease ✓
    E. Uncontrolled DM

Ans: Ischemic heart disease

Explanation: The most common cause of death in Cushing syndrome is cardiovascular disease followed by sepsis and uncontrolled DM. High level of circulating cortisol increases the risk of atherosclerosis.

55. Which of the following drug acts as a glucocorticoids receptor antagonist?
    A. Spironolactone
    B. Mifepristone ✓
    C. Mitotane
    D. Aminoglutethimide
    E. Ketoconazole

Ans: Mifepristone

Explanation: Ketoconazole, Metyropone, aminoglutethimide and Mitotane are inhibitors of steroidogenesis. Spironolactone is the mineralocorticoid receptor antagonist. Mifepristone is the glucocorticoids receptor antagonist.

56. A 48 year old female is diagnosed as a case of Cushing syndrome due to unilateral adrenal adenoma. She has been treated with laparoscopic right adrenalectomy. Glucocorticoid treatment is started post operatively. For how long this should be continued?
    - A. 6 months minimum
    - B. 12 months minimum
    - C. 18 months minimum
    - D. Lifelong treatment
    - E. When adrenal axis is recovered ✓

Ans: When adrenal axis is recovered

Explanation: Cushing syndrome caused by unilateral adrenal adenoma causes suppression of ACTH and HPA axis resulting in suppression of steroidogenesis in the contralateral gland. After surgery, patient becomes deficient in glucocorticoids. The extent and the duration for which this axis remains suppressed is highly variable. Patient should be started on steroids empirically until the recovery of HPA axis is documented.

57. Which of the following is the most reliable test for confirmation of pituitary ACTH secreting adenoma?
    - A. 24 hour urinary free cortisol
    - B. Low dose dexamethasone suppression test
    - C. High dose dexamethasone suppression test
    - D. Bilateral inferior petrosal sinus sampling ✓
    - E. Basal plasma ACTH level

Ans: Bilateral Inferior petrosal sinus sampling

Explanation: When available, inferior petrosal sinus sampling with measurements of ACTH is the best and most reliable method of confirming Cushing disease. It has 100% sensitivity and specificity. In this procedure, both these sinuses are catheterised, similar distance from the gland. Baseline samples obtained simultaneously from both catheters and the periphery. Corticotrophin releasing hormone is then injected and sequential, simultaneous samples are obtained. Typical ratios are as follow:

- Pre CRH administration: > 1.7:1 central: peripheral => pituitary source. < 1.5:1 => ectopic source
- Post CRH administration: > 3.3:1=> pituitary source. < 1.8:1=> Ectopic source
- Lateralization: > 1.4:1 interpetrosal gradient

58. A 19 year old girl with history of Hypertension is diagnosed as having 11-beta hydroxylase deficiency. Which of the following is likely to be raised markedly in this patient?
    - A. 17-OH-pregnenolone
    - B. Oestradiol
    - C. 11-deoxycortisol
    - D. 17-OH-progesterone

CAH.
21α.
11β

E. Oestrone

Ans: 11-deoxycortisol

Explanation: Deficiency of 11-beta hydroxylase enzyme is the 2nd most common cause of congenital adrenal hyperplasia. 11-beta hydroxylase is responsible for conversion of 11- deoxycorticosterone and 11-deoxycortisol to corticosterone and cortisol. In deficiency of this enzyme, 11- deoxycortisol is markedly raised. 17-OH hormones also raised but less than the 11-deoxycortisol. Deficiency of this enzyme causes glucocorticoids deficiency with an excess of mineralocorticoid and androgens. Metyropone used in the treatment of Cushing syndrome also inhibits this enzyme.

59. Which of the following is the most common cause of congenital adrenal hyperplasia?
    - A. 11-beta hydroxylase deficiency
    - B. 17-hydroxylase deficiency
    - C. Oxyreductase deficiency
    - D. 21-hydroxylase deficiency
    - E. 5-alpha reductase deficiency

17OH 21 α H.
11deo ⇒ 11 B. Hy.
21-α.
11 B.

Ans: 21-hydroxylase deficiency

Explanation: Mutations causing deficiency of 21-hydroxylase deficiency is the most common cause of CAH, responsible for 90-95% of cases. It leads to deficiency of both mineralocorticoid and glucocorticoids with an excess of adrenal androgens. 17-hydroxyprogesterone and 21-deoxycortisol levels are elevated in both serum and urine.

60. A 11 year old male is presented with history of failure to thrive, weakness, abdominal pain and hyperpigmentation. He has low serum cortisol. He was diagnosed as having CAH due to 21-hydroxylase deficiency on subsequent investigation. Which of the following is the best treatment for him?
    - A. Hydrocortisone+ fludrocortisone ✓
    - B. Hydrocortisone alone
    - C. Fludrocortisone alone
    - D. Dexamethasone+ DHEA
    - E. Prednisone + DHEAS

21α.
11 B.

✓

Ans: Hydrocortisone + fludrocortisone

Explanation: In children with 21 hydroxylase deficiency, there is deficiency of both glucocorticoids and mineralocorticoid and an excess of adrenal androgens. So, the best treatment in these patients is hydrocortisone 20-25 mg divided three times daily with fludrocortisone and salt replacement. These patients already have high androgens level, so DHEA is contraindicated. Monitoring to the treatment response is checked by 17-OH progesterone levels.

61. A 45 year old male presented with complaints of generalized lethargy and weakness. Examination showed moon face, buffalo hump and central obesity. He is also an alcoholic and is taking medications for moderate depression. Fasting serum cortisol is high after overnight dexamethasone suppression test. Which of the following test is used to differentiate between Cushing Syndrome and Pseudo-Cushing syndrome?

A. High dose dexamethasone suppression test
B. Bilateral adrenal vein sampling
C. Bilateral inferior petrosal sinus sampling
D. Midnight serum cortisol levels
E. Serial ACTH measurements

Depression + alcohol

Ans: Midnight serum cortisol levels

Explanation: Pseudo- Cushings syndrome (PCS) is a group of conditions associated with clinical and biochemical features of Cushing syndrome, but the hypercortisolemia is usually secondary to other factors. It is very important to rule out these conditions before making a diagnosis of Cushings syndrome, as it may subject the patient to unnecessary investigations and possible harmful interventions. Some frequently occurring illnesses can induce a phenotype that largely overlaps with Cushing syndrome and is accompanied by hypercortisolism. Common illnesses causing PCS include chronic alcoholism, stress, depression, obesity, uncontrolled DM and OSA. A midnight serum cortisol level of less than 7.5 μg/dL has 96% sensitivity and 100% specificity in differentiating pseudo-Cushing from true CS. The hallmark of true Cushing syndrome is lack of diurnal variation in serum cortisol. However in pseudo-Cushing diurnal variation is normally maintained. Mid night cortisol will be low in PCS and high in Cushing syndrome.

62. Which of the following clinical sign will differentiate between Cushing syndrome and pseudo Cushing caused by obesity?
A. Truncal fats
B. Moon face
C. Buffalo hump
D. [✓ Myopathy]
E. Abdominal striae

Ans: Myopathy

Explanation: Obesity can have all of the above clinical features of Cushing syndrome except proximal myopathy which is present in Cushing syndrome.

63. A 64 year old male presented with history of right sided abdominal pain for 3 months. CT abdomen was done which showed a high density 5 cm lesion in right adrenal gland suspected as a metastatic deposit. Which of the following is the most common primary tumor causing adrenal metastasis?
A. Colorectal cancer
B. Kidney
C. [✓ Lung]
D. Prostate
E. Thyroid

Ans: Lung

Explanation: Adrenal metastases are the most common malignant lesions involving the adrenal gland and the second most common tumor of the adrenal gland after benign adenomas. Adrenal glands are the fourth most common site of metastases in malignant disease, which is significant considering the relatively small size of adrenals. Adrenal metastasis can occur from primaries in the lung (39%), breast (35%), melanoma, gastrointestinal tract, pancreas, and kidney among other places.

64. A patient who is a confirmed case of Cushing syndrome following a low dose dexamethasone suppression test, is found to have an increased ACTH level and incomplete response to a high dose dexamethasone suppression test. Further testing shows an increase of 10% cortisol level following administration of corticotropin releasing hormone. What is the most likely definite diagnosis?
    A. Exogenous steroids
    B. Ectopic ACTH secretion
    C. Conns Syndrome
    D. Cushings disease
    E. Adrenal adenoma

Ans: Ectopic ACTH secretion

Explanation: To determine the cause of Cushing syndrome in ACTH dependent Cushing, high dose dexamethasone suppression test is done. In Cushing disease, this causes >50% suppression in serum cortisol from baseline. Another test used to differentiate between Cushing disease and Ectopic ACTH secretion is CRH stimulation test. After 100 mg CRH IV stimulation, if there is > 20% rise of cortisol or > 50% rise of ACTH from baseline, it suggests Cushing disease as the cause. If less than this, it suggests ectopic ACTH production.

65. A 39 year old female who is a diagnosed case of hypothyroidism on levothyroxine presented with complaints of weight loss, anorexia, abdominal pain, hyperpigmentation and dizziness after standing from sitting for [illegible] months. Her TFTs are within normal limits. Examination showed low blood pressure which drops further after standing from sitting. Which of the following can be the cause of this patient symptoms?
    A. Undertreatment of hypothyroidism
    B. Overtreatment of hypothyroidism
    C. Adrenocortical insufficiency
    D. Panhypopituitarism
    E. Cushing disease

Ans: Adrenocortical insufficiency

Explanation: The presence of weight loss, hyperpigmentation and postural Hypotension in a patient should raise suspicion of adrenocortical insufficiency. In patients with hypothyroidism, it is suggested to evaluate adrenal function before starting levothyroxine because levothyroxine increases the demand of cortisol and can cause acute adrenal crisis. Normal TFTs rule out under and overtreatment. Panhypopituitarism does not cause hyperpigmentation.

66. Which of the following is the most common cause of adrenocortical insufficiency?
    A. Autoimmune Addison disease
    B. Congenital adrenal hyperplasia
    C. Tuberculosis+ HIV
    D. Metastatic carcinoma
    E. Secondary adrenocortical failure

Ans: Secondary adrenocortical failure

Explanation: The most common cause of adrenocortical insufficiency is ACTH deficiency (secondary adrenocortical failure), usually because of inappropriate withdrawal of chronic glucocorticoids therapy or a surgical removal of a pituitary or unilateral adenoma. The most common cause of Addison disease is autoimmune Addison.

67. Which of the following biochemical profile is commonly present in patients with Addison disease?
    - A. Low Na, low K, low Calcium
    - B. Low Na, high K, low calcium
    - C. Low Na, high K, high Calcium
    - D. High Na, high K, high Calcium
    - E. High Na, low K, low calcium

Ans: Low Na, high K, high calcium

Explanation: Addison disease is associated with hyponatremia (hypovolemic), hyperkalemia (with low aldosterone), hypercalcemia with normal anion gap metabolic acidosis.

68. A 51 year old female presented with history of cough with sputum associated with high grade fever for 3 days. On presentation, her blood pressure was 80/40 mmhg. You have resuscitated her with 2 L IV saline but blood pressure is still 85/55. You examined the patient and noted cushingoid features. What should be the next most appropriate step in management?
    - A. Dextrose saline 1 L
    - B. Fludrocortisone 0.1 mg
    - C. Norepinephrine infusion
    - D. Hydrocortisone IV 100mg
    - E. Dopamine infusion

Ans: Hydrocortisone 100 mg IV

Explanation: This patient is most probably on long-term exogenous steroids therapy, which is the most common cause of cushingoid features and also the most common cause of Addisonion crisis after inappropriately stopping exogenous steroids. This patient presented with history of pneumonia. During acute illness, steroids requirements is increased and patient can present with acute crisis with persistently low BP and intractable hypoglycemia. IV hydrocortisone 100 mg stat followed by 100 mg Q6 hrly should be given for 1st 24 hours.

69. A 55 year old female is suspected case of adrenocortical insufficiency. Patient has Hyponatremia, Hyperkalemia with postural hypotension. Which of the following is the best test to confirm the diagnosis?
    - A. Random serum cortisol
    - B. Random serum ACTH
    - C. Aldosterone: renin ratio
    - D. ACTH stimulation test
    - E. CT scan abdomen

Ans: ACTH stimulation test

Explanation: Random plasma cortisol is usually low in patients with adrenal insufficiency but it may be within the reference range for a seriously ill patient. Random measurement of plasma cortisol cannot therefore be used to confirm or refute the diagnosis, until the value is above 500nmol/l, which effectively excludes adrenal insufficiency. The best test is the short ACTH stimulation test also called short Synacthen test. Cortisol levels fail to increase in response to exogenous ACTH in patients with adrenocortical insufficiency. Aldosterone: renin ratio is used to assess mineralocorticoid activity in a confirmed case of Addison disease.

70. A 35 year old female has low serum cortisol which is failed to raise after stimulation by ACTH. Serum ACTH is measured, which is very high. Which of the following should be the next best investigation for her?

A. 21-hydroxylase antibodies
B. CT adrenal
C. MRI adrenal
D. MTB DNA by PCR
E. HIV testing

21 HO

11(B).

ACTH

ACTH

low 21

21

low ACTH.

Ans: 21- hydroxylase antibodies

Explanation: This patient has primary adrenocortical insufficiency as revealed by low serum cortisol which is failed to raise after stimulation by ACTH. High ACTH level confirms the primary adrenal failure. The next step should be to determine the cause of Addison disease. The most common cause of Addison disease is autoimmunity. The most common antibody present is 21-hydroxylase antibodies followed by 17-hydroxylase antibodies. If antibody screening is negative, the next step is imaging study of adrenal gland and HIV testing.

Autoimmune ; Haem

71. Which of the following is the differentiating feature between type 1 and type 2 autoimmune polyendocrine syndrome?

A. Addison disease
B. Primary hypothyroidism
C. Type 1 Diabetes mellitus
D. Hypoparathyroidism ✓
E. Primary hypogonadism

2

Ans: Hypoparathyroidism

Explanation: Polyglandular autoimmune syndromes are constellation of multiple endocrine gland insufficiencies. There are two types of Polyglandular syndrome. Type 1 (APECED) and type 2(Schmidt syndrome). Characteristics features of both diseases are as follow:

Features	Type 1	Type 2
Addison disease	✓	✓
Hypoparathyroidism	✓	×
T1DM	✓	✓
Hypogonadism	✓(rare)	✓(Common)
Hypothyroidism	✓	✓
Mucocutaneous	✓	×

Candidiasis		
Graves' disease	×	✓
Celiac disease	×	✓
Pernicious anemia	×	✓
Nail and dental Abnormalities	✓	×

- The presence of hypoparathyroidism and mucocutaneous candidiasis is suggestive of Type 1 APS.
- Mucocutaneous candidiasis is 1st to appear followed by hypoparathyroidism followed by Addison disease in type 1 APS.
- Type 2 is the more common of the two and occurs in adults. It is characterized by obligatory occurrence of Addison+ Hashimoto thyroiditis and/or T1DM. The least frequent combination of Addison+ Graves+ T1DM is called Carpenter syndrome.

72. You have diagnosed a patient with Addison disease secondary to tuberculosis. You have decided to start him on prednisone 5 mg on waking and 2.5 mg at 1500 hrs. You have educated him and asked him about the disease. Which of the following should alert you to reeducate him?
    A. He will wear steroid card all the times
    B. He will take same dose at same time daily
    C. He will stop taking medicine during illness
    D. He will take high protein, high carbohydrate diet
    E. He will get injection if he cannot take medicine orally

Ans: He will stop taking medicine during illness

Explanation: Steroid dose should be increased atleast twice during the illness, stress and surgery. The patient should be reeducated about increasing the dose rather than stopping it during illness.

73. A 55 year old female is diagnosed as a case of polymyalgia rheumatica and she is prescribed prednisone 20 mg once daily and she has advised to take it for atleast 6 months. Which of the following prophylactic measure is not recommended before starting treatment?
    A. Chest X-RAY
    B. Fasting blood sugar
    C. DEXA scan
    D. Dexamethasone suppression test
    E. Eye examination

Ans: Dexamethasone suppression test

Explanation: This patient most probably will receive steroids therapy for prolonged time, so it is recommended that patient must be screened before starting long-term therapy

- Screen for TB with PPD or chest X-RAY
- Pregnancy test in reproductive age
- For diabetes before treatment and at each visit
- For hypertension
- For glaucoma and cataract before treatment, at 3 months and then annually
- For osteoporosis

74. A 37 year old male presented with headache and weakness has blood pressure of 170/100. He was started on lisinopril and hydrochlorothiazide. After 2 weeks, patients presented again with muscle weakness. Serum potassium is measured which was 2.9. Blood pressure is 150/100. Which of the following should be the best next test for this patient?
    A. Serum cortisol levels
    B. [✓ Aldosterone: PRA ratio]
    C. Captopril suppression test
    D. ACTH stimulation test
    E. 24 hour urinary potassium

21α.
11β.

Ans: Aldosterone: PRA ratio

Explanation: Thiazide induced hypokalemia in a patient with high blood pressure should raise suspicion of primary aldosteronism. The ratio of plasma aldosterone to plasma renin activity is a useful screening test for primary hyperaldosteronism. Primary hyperaldosteronism is characterized by hypertension, hypokalemia, high aldosterone to renin ratio with high serum aldosterone levels. A ratio of aldosterone: PRA> 30:1 in conjunction with a plasma aldosterone concentration of > 555 pmol/l has a sensitivity and specificity of >90% for primary hyperaldosteronism. In patients with an elevated PA: PRA ratio, the diagnosis of primary aldosteronism can be confirmed by demonstrating failure to suppress plasma aldosterone to less than 277 pmol/l after IV infusion of 2 liter of isotonic saline over 4 hours.

75. A 42 year old patient with history of resistant hypertension on lisinopril, amlodipine, atenolol and hydrochlorothiazide is suspected to have primary aldosteronism. A decision is made to check plasma aldosterone to renin ratio for screening. Which of the following antihypertensive medications can be given to him which does not alter the test results?
    A. Captopril
    B. Valsartan
    C. Labetalol
    D. [✓ Verapamil]
    E. Indapamide

Ans: Verapamil

Explanation: ACE inhibitors and ARBs cause an increase in the level of renin and beta blockers cause suppression of renin level. Diuretic increases the level of renin. So all these classes of antihypertensive medications should be stopped at least 2 weeks before the test. Slow release verapamil, hydralazine, prazosin and doxazosin can be used in this time period.

76. A patient is diagnosed as a case of primary aldosteronism on the basis of high plasma aldosterone: renin ratio. Patient is having resistant hypertension and a decision is made to do unilateral adrenalectomy. Which of the following is the best test which should be done before surgery in this patient?
    A. CT abdomen
    B. MRI abdomen
    C. Iodocholestrol scintigraphy
    D. [✓ Bilateral adrenal vein sampling]
    E. Genetic testing

Ans: Bilateral adrenal vein sampling

Explanation: The initial test is CT abdomen which will show an adrenal adenoma. But CT cannot detect small adenoma and has a sensitivity and specificity of 78% for unilateral aldosteronism. Therefore, the decision to perform unilateral adrenalectomy should not be based solely on the adrenal CT scan. Adrenal vein sampling is required before doing unilateral adrenalectomy for primary hyperaldosteronism. It is the most accurate and the best method of differentiating unilateral from bilateral forms of primary aldosteronism. The sensitivity and specificity of adrenal venous sampling is 95 and 100% respectively, for detecting unilateral aldosterone hypersecretion which is superior to those of adrenal CT scan.

77. A patient is having high blood pressure is diagnosed to have hyperaldosteronism secondary to bilateral adrenal hyperplasia. Which of the following is the treatment of choice for him?
    - A. Bilateral adrenalectomy
    - B. Partial adrenalectomy
    - C. Spironolactone ✓
    - D. Dexamethasone
    - E. Labetalol

Ans: Spironolactone

Explanation: Primary hyperaldosteronism + adrenal adenoma=> unilateral adrenalectomy

Primary hyperaldosteronism + bilateral adrenal hyperplasia => spironolactone. Eplerenone during pregnancy and in men.

Primary hyperaldosteronism + normal adrenals + family history of early age hemorrhagic stroke/ early onset(20 years) aldosteronism => glucocorticoids remediable aldosteronism => genetic testing and urinary 18 hydroxy cortisol => treatment is low dose dexamethasone.

78. A 57 year old male is investigated for diverticulitis with an abdominal CT scan. In addition to diverticulitis, a mass is also found in the right adrenal gland. Which of the following character of this mass increased the risk of mass being malignant?
    - A. Size of 2.5 cm
    - B. CT density of 7 HU
    - C. 25% Contrast washout
    - D. Round and homogeneous
    - E. High fat contents

Ans: 25% contrast washout

Explanation: The adrenal mass detected during CT or MRI done for other indications are called incidentaloma. The 4 important features which increased the risk of the adrenal incidentaloma being malignant are size > 4 cm, tumor density on unenhanced CT > 20 HU; irregular, lobulated and heterogeneous appearance and < 40% Contrast washout after 15 minutes of giving contrast. Benign tumors contain more lipid contents.

The first step after detecting adrenal incidentaloma is screening for hormone excess => if positive=> confirmatory test => treat with unilateral adrenalectomy. If negative screening then:

CT with and without contrast=> highly suggestive of malignancy=> unilateral adrenalectomy (FNAC of adrenal mass is contraindicated).

If imaging does not suggest high malignancy risk => repeat screening for hormone excess annually.

79. A 55 year old female is presented with polyuria, weight gain and weakness. She is subsequently diagnosed as a case of Cushing syndrome due to right adrenocortical carcinoma with no metastasis. Which of the following is the best treatment option for him?
    - A. Right adrenalectomy+ radiotherapy+ Steroids
    - B. Right adrenalectomy + Mitotane + Steroids ✓
    - C. Right adrenalectomy + steroids
    - D. Right adrenalectomy + Mitotane
    - E. Right adrenalectomy + chemotherapy

Ans: Right adrenalectomy + Mitotane+ Steroids ✓

Explanation: Surgical resection of the tumor is the preferred method for cure from adrenocortical carcinoma. Patients should be given adjuvant mitotane for at least 2 years. Mitotane treatment results in disruption of cortisol synthesis and thus requires glucocorticoid replacement at least two times of that usually used in adrenal insufficiency because Mitotane induces hepatic cytochrome p4503A4 activity resulting in rapid inactivation of glucocorticoids. Radiotherapy only used in painful bony metastasis. Chemotherapy is used when tumor recurs or progresses during mitotane treatment.

80. A 47 year old hypertensive male with 3 years history on lisinopril 20 mg with poor control came for review. He also complains of occasional panic attacks for which his psychiatrist put him on paroxetine. You have added atenolol 50 mg as patient was also having tachycardia. After 2 days, patient presented back with severe headache. BP measured was 180/110 mmhg. Which of the following should be your next best step?
    - A. Aldosterone:PRA ratio
    - B. Doppler USG abdomen
    - C. Urinary metanephrine ✓
    - D. Urinary free cortisol ✓
    - E. Serum IGF 1 level

ACE i.
Par SSR I.
atenol
B.

4cm
3-4
4-4.5

Ans: Urinary metanephrine

Explanation: The history of uncontrolled hypertension and paroxysmal panic attacks with worsening of blood pressure after starting a beta blocker is suggestive of the presence of pheochromocytoma. The best initial screening test is urinary free metanephrine.

VT rhythm

Sensitivity and specificity of different tests used for screening:

Test	Sensitivity	Specificity
Urinary metanephrine	100%	94%
Urinary catecholamine	84%	99%
Plasma catecholamine	76%	88%
Urinary VMA	72%	96%

Urinary free metanephrine has the highest sensitivity and is superior to urinary catecholamine, VMA and plasma catecholamine as screening test. VMA is less expensive test and plasma catecholamine level is less cumbersome.

α β

81. A 53 year old male is diagnosed as a case of pheochromocytoma after a screening test by urinary metanephrine which was very high. Patient has history of labile hypertension. Which of the following is the best initial test for localization of the tumor?
    - A. CT abdomen
    - B. MRI abdomen
    - C. MIBG scan
    - D. PET scan
    - E. FNAC of both adrenals

C

Ans: CT abdomen

Explanation: Imaging studies should be done after the biochemical confirmation of pheochromocytoma. CT abdomen rather than MRI is recommended as the 1st choice imaging modality because it has excellent spatial resolution for thorax, abdomen and pelvis. MRI is recommended in metastatic tumor, for detection of skull base and neck paraganglioma, in patients with surgical clips causing artifacts when using CT, in patients with an allergy to CT contrast and in patient in whom radiation exposure should be limited like children, pregnant women, patients with known germline mutations and those with recent excessive radiation exposure. MIBG scan is used in metastatic disease but it is inferior to PET scan for metastatic disease. FNAC of adrenal is contraindicated because it can induces a hypertensive crisis.

82. Which of the following is the best initial medical treatment used in pheochromocytoma to control blood pressure?
    - A. Nifedipine
    - B. Amlodipine
    - C. Atenolol
    - D. Phenoxybenzamine
    - E. Propranolol

50000, 10,000

IVIG

Ans: Phenoxybenzamine

Explanation: Although surgery is the best treatment for pheochromocytoma but it is recommended that all patients with hormonally functional tumor should undergo pre-operative blockage to prevent perioperative cardiovascular complications. The initial drug of choice is an alpha adrenergic receptor blocker. Phenoxybenzamine or Doxazosin should be started 10-14 days before surgery. CCB can be used as add on therapy but monotherapy is not recommended. Beta blockers should only be given at least 4 days of alpha blockers treatment.

IVIG 50.00 80,00

83. You have received a call from surgical department for a patient diagnosed with pheochromocytoma. He is on a list for surgery after 5 days. Surgeon needs your opinion regarding management preoperatively and during surgery. What will you recommend?
    - A. Stop alpha blockers preoperatively
    - B. Stop beta blockers pre-operatively
    - C. Saline infusion preoperatively

D. There is risk of hypertension after surgery
E. Labetalol infusion during surgery

Ans: Saline infusion preoperatively

Explanation: In chronic pheochromocytoma associated vasoconstriction, volume is contracted and patient can have postural hypotension due to this volume contraction. There is a high risk of peri and post-operative hypotension due to this volume contraction. It is recommended that patient should have a high salt diet and water intake and saline infusion should be given 1-2 days before surgery to prevent the hypotension. Alpha and beta blockers should be continued to prevent perioperative hypertension and tachycardia. There is a risk of post-operative Hypotension after surgery, so patient vital monitoring is very important.

84. A rule of 10 is commonly used for the characteristics of pheochromocytoma. Which of the following is not included in this rule?
   A. 10% familial
   B. 10% Bilateral
   C. 10% in children
   D. 10% Adrenal
   E. 10% malignant

adreno

kidney

Ans: 10% Adrenal

Explanation: 80-90% of tumors causing pheochromocytoma are adrenal. 10% are extra adrenal. Other 10% included in this rule are 10% not associated with hypertension and 10% contains calcification.

85. A 63 year old female with history of constipation has routine blood tests done which showed a serum calcium of 11.7 mg/dl. What should be the next best initial investigation for her?
   A. Ionized calcium
   B. Alkaline phosphatase
   C. Serum phosphate
   D. Intact PTH ✓
   E. 24 hour urinary Calcium

Serum calcium

PTH

Ans: Intact PTH

Explanation: Although all of the above tests should also be done but the best initial test should be to check intact PTH which will further narrow down the differential diagnosis. If PTH will be high or high normal, it would be due to primary hyperparathyroidism. If low then due to some other causes.

86. A 57 year old female with history of hypertension presented with polyuria and generalized aches and pains for 3 months. She is taking vitamin D on and off for these pains. Labs were done which showed Na 134, K 3.6, Ca 11.3, Phosphate 1.9, RBS 145 and an intact PTH of 4.9(1-5.4). What is the most likely cause of this patient symptoms?
   A. Vitamin D intoxication
   B. Thiazide induced Hypercalcemia
   C. Primary hyperparathyroidism
   D. Diabetes mellitus

Ca+ ✓ PO4

Vit. D

↑

E. Hypokalemia

Ans: Primary hyperparathyroidism

Explanation: This elderly female patient with hypertension and polyuria with bone pains associated with high Calcium, low phosphate with inappropriately high normal intact PTH suggest primary hyperparathyroidism as the cause of this patient symptoms. Hypertension is commonly associated with primary hyperparathyroidism. Vitamin D intoxication causes high levels of both calcium and phosphate and suppressed PTH.

87. Which of the following is the most common cause of primary hyperparathyroidism?
    A. Solitary adenoma ✓
    B. Multiple adenoma
    C. Hyperplasia
    D. Carcinoma
    E. Metastasis

Cushu

CAH

2 lar: 11 B OH.

CAH

Adrenal

Ans: Solitary adenoma

Explanation: A solitary adenoma is the most common cause of primary hyperparathyroidism and accounts for 80% of cases followed by hyperplasia which accounts for 15% cases and multiple adenomas 4%. Carcinoma accounts for only 1% of cases.

88. A 37 year old male presented with history of recurrent urinary stones. You have ordered some investigations which showed Urea 21, creatinine 1.1, Ca 11.7, Phosphate 2.1 and intact PTH 5.3. What is the most probable diagnosis?
    A. Primary hyperparathyroidism
    B. Secondary hyperparathyroidism
    C. Tertiary hyperparathyroidism
    D. Renal Tubular acidosis
    E. Vitamin D intoxication

↑

Pen — PTH ↑ Ca ↑ PO_4 ↓

Sec. — ↑PTH. ↓ Ca ↑PTH

Titrially — PTH↑ Ca↑↑ PO_4 ↑↓

Upper

Ans: Primary hyperparathyroidism ✓

Explanation: High calcium and low phosphate with inappropriately high normal PTH with normal urea and creatinine suggest primary hyperparathyroidism as the most probable diagnosis.

89. Which of the following is an indication for surgical management of primary hyperparathyroidism? (10.4 upper limit of normal)
    A. Serum calcium 10.6
    B. Creatinine clearance 75ml/min/1.73m2
    C. Age of patient is 38 years
    D. 24 hour urinary calcium 200mg/day
    E. A T score of 1.5 on DXA scan

400 mg

30

Urine

100-300 mg/day

40-220day/day

Ans: Age of patient is 38 years ✓

Explanation: Indications of surgery in primary hyperparathyroidism are:

- Serum calcium >1 mg/dL above the upper limit of the reference range

45 m.

- Bone mineral density T-score at or below -2.5 (in perimenopausal or postmenopausal women and in men aged 50 years or older) at the lumbar spine, total hip, femoral neck, or distal 1/3 radius
- Vertebral fracture as evidenced via radiography or vertebral fracture assessment
- Creatinine clearance of < 60 ml/min/1.73m2
- Twenty-four–hour urinary calcium excretion >400 mg/day and increased stone risk as assessed through biochemical stone risk analysis.
- Age younger than 50 years. ✓ (45)

100-300g

30-80
4%(g)

Asymptomatic patients who do not undergo surgery require long-term monitoring. Recommendations include assessing for overt signs and symptoms of hyperparathyroidism annually, annual serum calcium and creatinine testing, and bone mineral density (spine, hip, and forearm) evaluation every 1-2 years.

90. A 45 year old female is admitted with abdominal pain, general body aches and pains for 2 months. She has no past medical history and she ~~is not taking~~ any medications. Her labs were done which showed Ca 10.6, Phosphate 2.2, urea 18, creatinine 0.9 and intact PTH 3.9. 24 hour urinary calcium is below normal. What is the most probable diagnosis?
    - A. Primary hyperparathyroidism
    - B. Secondary hyperparathyroidism
    - C. Tertiary hyperparathyroidism
    - D. Hypocalciuric hypercalcemia ✓

50

Ans: Hypocalciuric hypercalcemia

Explanation: Familial benign (Hypocalciuric hypercalcemia (FHH) is caused by a loss-of-function mutation of one allele of the gene for the calcium-sensing receptor. It causes hypercalcemia, hypophosphatemia, and Hypermagnesemia. The parathyroid hormone level is usually within the reference range or is mildly elevated. It can be distinguished from primary hyperparathyroidism by low 24-hour urinary calcium excretion. Persons with FHH are asymptomatic. Parathyroidectomy is not indicated. 24 hour urinary Calcium should be done in all patients with a diagnosis of primary hyperparathyroidism to rule out FHH to avoid surgery.

91. A 47 year old female presented with lethargy, constipation, polyuria, headache and general body aches and pains for 2 months. Patient is taking multiple over the counter medications for bone pains for 2-3 years. Her labs were done which showed Ca 12.3, phosphate 4.5, urea 23, creatinine 1.2 with undetectable PTH. What is the most likely diagnosis?
    - A. Primary hyperparathyroidism
    - B. Primary hypothyroidism
    - C. Osteomalacia ↓ ↓ ↑
    - D. Vitamin D intoxication
    - E. Secondary hyperparathyroidism ↑ ↓ ↓↑

<50yr
60ml/min
400mg/day
↑1mg/dl

Ans: Vitamin D intoxication

Explanation: Vitamin D intoxication or toxicity due to excess of vitamin D (hypervitaminosis D) is a clinical condition characterized by severe hypercalcemia that may persist for a prolonged time, leading to serious health consequences. Exogenous vitamin D intake is the most common cause of this. Exogenous vitamin

D toxicity due to vitamin D overdosing is diagnosed by markedly elevated 25(OH) D concentrations (>150 ng/ml) accompanied by severe hypercalcemia and hypercalciuria and by very low or undetectable PTH activity. It is also associated with high phosphate level.

92. A 67 year old smoker presented with complaints of progressive altered sensorium associated with irritability and decrease urine output for 3 days. Examination showed decrease skin turgor with dry mucous membranes. ECG showed short QT interval. Labs were done which showed serum calcium of 14.3 mg/dl. What should be the next best management step?

    A. 0.9% saline infusion
    B. IV furosemide
    C. S/C calcitonin
    D. IV hydrocortisone
    E. IV Pamidronate

1 mg/dl

Saline

Bi

Ans: 0.9% Saline infusion

Explanation: This patient is having severe hypercalcemia which is defined as serum calcium > 12.5 mg/dl. Levels > 14 are life-threatening. Aggressive hydration is the mainstay of treatment for severe hypercalcemia. Aggressive hydration enhances filtration and excretion of Ca++. Normal saline should be used to achieve a urine output of 200 mL per hour. IV furosemide can be used after hydration and good urine out. Normal saline infusion should be followed by IV Pamidronate infusion. Hypercalcemia that is refractory to both saline infusion and Pamidronate should be managed with calcitonin. Steroids are indicated in hypercalcemia caused by multiple myeloma and Sarcoidosis.

93. A 57 year old male is being treated for symptomatic hypercalcemia secondary to squamous cell carcinoma of lung. He is slow to respond to saline infusion and IV Pamidronate. Which of the following is the next best step in management?

    A. Furosemide infusion
    B. Insulin+ dextrose infusion
    C. Dialysis
    D. Calcitonin 4 u/kg IM ✓
    E. Zolendronic acid infusion

30 u/kg

25 u/kg hours

2.5 – 30

35 000.

5 ICU

Ans: Calcitonin 4U/kg IM 4

Explanation: The next step after saline infusion and bisphosphonate is IM or SC Calcitonin 4 U/kg every 12 hours. It inhibits osteoclastic bone resorption, decreases serum calcium, and increases renal excretion of phosphate, calcium, sodium, magnesium and potassium by decreasing tubular reabsorption. Dialysis is the last step if Hypercalcemia not controlled with medical treatment.

94. A 55 year old male has a parathyroidectomy three days ago for a long standing primary hyperparathyroidism due to a solitary adenoma. You received a call from surgery department that patient is feeling tingling sensations in his fingers and back. He also complains of difficulty breathing for 1 hour. You have examined the patient and during taking blood pressure, you have noted **obstetrician hand sign.** Which of the following is the most likely explanation for patient symptoms?

    A. Parathyroid carcinoma

B. Secondary hyperparathyroidism
C. Hypomagnesaemia
D. Hungry bone syndrome ✓
E. Secondary hypoparathyroidism

Ans: Hungry bone syndrome

Explanation: Hungry bone syndrome refers to the rapid, profound, and prolonged hypocalcaemia associated with hypophosphatemia and hypomagnesaemia, and is exacerbated by suppressed parathyroid hormone levels, which follows parathyroidectomy in patients with severe primary hyperparathyroidism and preoperative high bone turnover. It is a relatively uncommon, but serious adverse effect of parathyroidectomy. The term 'hungry bone syndrome' has been coined to the profound (serum calcium <2.1mmol/l) and prolonged (longer than 4th day post-operatively) hypocalcaemia, which follows parathyroidectomy for severe hyperparathyroidism. This is usually associated with skeletal manifestations, reflected by high preoperative indices of bone turnover, osteitis fibrosa cystica and/or 'brown tumors'. The severe hypocalcaemia is believed to be due to the greatly increased skeletal usage of calcium, thought to occur as a result of removal of the effect of high circulating parathyroid hormone levels on bone, with immediate arrest of bone resorption in the face of continuing and enhanced bone formation.

95. A 35 year old female is presented with history of tingling sensations and numbness at night time associated with abdominal cramps. She is also taking valproic acid for adult onset epilepsy. You examined her and during examination you observed carpopedal spasm. Labs were done which showed low Calcium, high phosphate, low PTH and high alkaline phosphatase. What is your diagnosis?

A. Vitamin D deficiency
B. Hypoparathyroidism ✓
C. Pseudohypoparathyiodism
D. Vitamin D resistance
E. Autosomal dominant hypocalcemia

parathy
Ca++
PTH

Ans: Hypoparathyroidism

Explanation: The patient has typical signs and symptoms of hypocalcemia. Labs showed low calcium with high alkaline phosphatase and phosphate and low PTH which is characteristic of Hypoparathyroidism.

Causes of hypocalcemia:

Disease	PO4	Alk Phos	PTH	Vit D
Vitamin D deficiency	Low	High	High	Low
Hypoparathyroidism	High	High	Low	Normal
Renal disease	High	High	High	Low
Pseudohypoparathyiodism	High	Normal	High	Normal
Vitamin D resistance	Low	Normal	Low	Normal
A.dominant hypocalcemia	Normal	Normal	Normal	Normal
Hypomagnesaemia	Normal	Normal	Low	Normal

96. Which of the following is the most common cause of hypocalcemia?

A. Autoimmune Hypoparathyroidism

B. Iatrogenic
C. Hypomagnesaemia
D. Vitamin D deficiency ✓
E. Renal disease

Ans: Vitamin D deficiency

Explanation: The most common cause of hypocalcemia is vitamin d deficiency which accounts for almost 50% of patients.

97. Which of the following is the most specific sign of hypocalcemia?
    A. Chvostek sign
    B. Trousseau sign ✓
    C. Prolonged QT interval
    D. Short QT interval
    E. Laryngospasm

(4-1)×0.8+

Ans: Trousseau sign

Explanation: Trousseau sign is the most reliable and specific sign of hypocalcemia and present in 94% of patients with hypocalcemia and 1% of healthy individuals. It is the presence of carpopedal spasm observed following application of an inflated blood pressure cuff over systolic pressure for 3 minutes in hypocalcemic patient. It is also called obstetrician hand sign. Chvostek sign is the twitching of the upper lip with tapping on the cheek 2 cm anterior to the earlobe, below the zygomatic process overlying the facial nerve. 10% of the normal people have a positive Chvostek sign. Laryngospasm occurs in severe hypocalcemia. Prolonged QT interval can occurs in hypocalcemia but not a sensitive and specific sign.

98. A 37 year old male is referred to you for further assessment of an abnormal blood test which was done pre-operatively for a hernia repair. Lab showed serum calcium 7.6 mg/dl with normal serum phosphate. Serum albumin is 2.5 g/dl. What is the corrected calcium level in this patient?
    A. 7.8 mg/dl
    B. 8.2 mg/dl
    C. 8.8 mg/dl
    D. 9.2 mg/dl
    E. 7.2 mg/dl

$\boxed{200}$ $\boxed{2mmol}$ (4-Alb)0.8+ —

Ans: 8.8 mg/dl

Explanation: The serum calcium concentration must be interpreted in relation to serum albumin. Serum calcium exists in an ionized form or is bound to albumin or other ions. Only ionized calcium is biologically important. Various factors alter the ratio of ionized calcium to bound calcium, but the most important factor is the albumin concentration. Many medical conditions cause a decrease in serum albumin. Serum calcium concentrations are therefore **corrected** to a reference albumin concentration of 4 g/dl, and for every 1g/dl of albumin above or below this value, the calcium is adjusted by decreasing or increasing by 0.8 mg/dl. The formula used for corrected Calcium is as follows;

Corrected Calcium= serum calcium+ 0.8(4-serum albumin).

4 - $\boxed{2.5}$

$$\begin{array}{r} 1.5 \\ 0.8 \\ \hline 120 \end{array}$$

1.20

99. A 29 year female presented in emergency with status epilepticus for 3 hours. She was taking two antiepileptics with poor seizures control. Examination showed a stridor. CT brain was done which showed bilateral basal ganglia calcifications. ECG showed prolonged QT interval. What should be the immediate management step in this patient?

1.6

- A. IV magnesium sulfate
- B. IV Pamidronate
- C. Calcium gluconate IV ✓
- D. IV saline infusion
- E. IV calcitonin

30

Ans: Calcium gluconate IV

Explanation: This patient is having acute hypocalcemic emergency as reflected by status epilepticus and laryngospasm. Bilateral basal ganglia calcifications is most commonly seen in patients with Hypoparathyroidism. QT interval prolongation is also a sign of hypocalcemia. The best treatment is 1-2 10 ml ampoules of calcium gluconate in 100 ml of 5% dextrose over 10 minutes followed by ten 10 ml ampoules of 10% calcium gluconate in 1L of 5% dextrose at 50 ml/hr.

100. A 45 year old male is diagnosed as a case of Hypoparathyroidism. He is started on oral Calcium supplements and calcitriol 0.5 micrograms. Which of the following is the most important complication of long term use of this therapy that must be monitored?

- A. Milk alkali syndrome
- B. Nephrocalcinosis ✓
- C. Gastric ulcer
- D. Osteomalacia
- E. Osteoporosis

400mg

done

7 1mg

(4-5) x 0.8

50yr

Ans: Nephrocalcinosis

Explanation: As patient is deficient of PTH, calcium cannot be absorbed from the kidneys which leads to high urinary calcium level. This can leads to Increased stone formation and nephrocalcinosis. Serum calcium should be kept in the lower range of normal. Serum calcium should be monitored every 3-6 months and urinary calcium annually.

101. A 21 year old female presented with weight gain associated with short stature. She also complains of numbness and tingling sensation in both hands. Examination showed BMI 31kg/m2 with short 4th and 5th metacarpals. Labs were done which showed low Calcium with high Phosphate and very high PTH level. Urea and creatinine are normal. What is the most probable diagnosis?

- A. Primary hyperparathyroidism
- B. Secondary hyperparathyroidism
- C. Pseudopseudohypoparathyroidism (PPHP)
- D. Pseudohypoparathyiodism type 1a (PHP-1a)
- E. Pseudohypoparathyiodism 1b (PHP-1b)

Ans: Pseudohypoparathyiodism type 1a (PHP-1a)

V11

V

Type

11b

des

thrombocytic

PTH ↑

Explanation: This patient has low calcium, high phosphate and high PTH with obesity, short stature and short 4th and 5th metacarpals which are suggestive of pseudohypoparathyroidism type1a. Patient with PHP- 1b have same biochemistry without other clinical manifestations whereas patients with PPHP would have same clinical features with normal biochemistry. PHP is caused by target cell insensitivity to parathyroid hormone due to a mutation in C protein.

102. Which of the following is the best test to confirm the diagnosis of pseudohypoparathyroidism?

A. Urinary Calcium level
B. Urinary Phosphate level
C. Urinary cAMP after PTH infusion ✓
D. Genetic studies
E. Urinary PTH level

PTH.

Ans: Urinary cAMP after PTH infusion

Explanation: Infusion of PTH followed by measurement of urinary phosphate and cAMP measurement is the best test to diagnose PTH resistance. It also helps in differentiating between PHP types I and type II. In type I, there is blunted cAMP response to PTH infusion, neither cAMP nor phosphate levels rise. Whereas in PHP-II, cAMP level will rise but phosphate level does not change.

103. A 53 year old female presented with complaints of generalized body aches and pains more in her arms and legs for several months. She also complains of cramps in calf muscles at night time. Labs were done which showed serum calcium 7.6 mg/dl, phosphate 1.9, albumin 4.2, alkaline phosphatase 368 and PTH 120. What is the most likely underlying diagnosis?

↓ ↓ ALP ↑.
↓ ↓.

A. Osteoporosis
B. Fibromyalgia
C. Osteomalacia
D. Pseudohypoparathyroidism
E. Primary hyperparathyroidism

Ans: Osteomalacia ✓

Explanation: Osteomalacia occurs due to vitamin D deficiency in adults. It is the most common bone disease worldwide. It leads to decrease mineral content with normal bony tissue. Bone pains, fragility fractures and muscle tenderness are common features. Typical biochemical abnormality is low calcium, low phosphate with high PTH and high alkaline phosphatase. Treatment is calcium with vitamin D.

104. A 40 year old female presented with four month history of headache and malaise and epigastric pain after meals. She also complained of palpitations and sweating. On examination she had a swelling in her neck which moved vertically with swallowing. Her heart rate is 125/min and blood pressure 180/120 mmhg. Investigations were done which showed increased calcium and low phosphate. What is the complete clinical diagnosis?

A. Primary hyperparathyroidism
B. Pheochromocytoma
C. MEN 1 syndrome ✓
D. MEN 2a syndrome

80

E. MEN 2b syndrome

Ans: MEN 2a syndrome

Explanation: This patient is having thyroid swelling (medullary carcinoma of thyroid), high blood pressure with high pulse rate (pheochromocytoma) and high calcium, low phosphate and epigastric pain due to Hypercalcemia (hyperparathyroidism). The combination of these in a single patient occurs due to MEN 2A which is also called Sipple syndrome. Other associated diseases are Hirschsprung disease and cutaneous lichen amyloidosis. In MEN 2b, hyperparathyroidism does not occur. MEN2b is associated with pheochromocytoma+ medullary carcinoma of thyroid+ Marfanoid habitus+ mucosal neuroma of lip, tongue and eyelids+ multiple Intestinal diverticula. Pheochromocytoma is not a feature of MEN 1.

105. Which of the following is not included in MEON (multiple endocrine and other organ neoplasia) syndrome?

A. Hyperparathyroidism- jaw tumor syndrome
B. Neurofibromatosis type 1
C. Cowden syndrome
D. Sipple syndrome ✓ Type Ad
E. McCune Albright syndrome

A Hyp

Ans: Sipple syndrome

Explanation: Sipple syndrome is also called MEN 2a syndrome. It is included in Multiple endocrine neoplasia MEN. There is another group of disorders which is associated with multiple endocrine and other organ neoplasia (MEONs). It contains six disorders:

- Hyperparathyroidism-jaw tumor syndrome: Parathyroid tumors+ fibro-osseous jaw tumors+ Wilm tumor/ papillary renal cell carcinoma + testicular mixed germ cell tumors
- Von Hippel Lindau Disease: Hemangioblastoma of retina and CNS+ renal cell carcinoma+ pheochromocytoma+ pancreatic islet cell tumors.
- Neurofibromatosis type 1 or von Recklinghausen Disease: Peripheral and spinal neurofibroma+ optic gliomas+ Lisch nodules+ café au lait macules+ pheochromocytoma + Carcinoid tumors+ scoliosis
- Carney complex: Face, labia and conjunctival skin pigmentation+ atrial myxoma+ schwannomas of sympathetic nerve chain and upper GIT + Cushing syndrome+ testicular tumors.
- Cowden syndrome: multiple hamartoma+ MNG+ follicular thyroid carcinoma+ breast adenocarcinoma.
- McCune Albright syndrome: polyostotic fibrous dysplasia+ café au lait skin pigmentation+ precious puberty+ thyrotoxicosis+ Cushing syndrome

CAH
2/9

106. A 31 year old female has history of MEN 2B diagnosed 10 years back which was managed successfully by total thyroidectomy and adrenalectomy. She has delivered a healthy baby 3 weeks ago and the screening showed RET gene mutation in the newborn. What should be the next best management step for baby?

A. Total thyroidectomy at age 15
B. Total thyroidectomy at age 10
C. Total thyroidectomy at age 5

D. Total thyroidectomy at age 3
E. Total thyroidectomy before age 1

Ans: Total thyroidectomy before age 1

Explanation: If patient has family history of MEN 2b, family screening should be done by RET gene mutation analysis. If present, prophylactic total thyroidectomy should be done as soon as possible or before 1 year of age. In MEN 2a, prophylactic thyroidectomy should be done before age 5. For MEN 2a, RET mutational analysis, serum Calcitonin and neck USG should be done before 3 years and screening for pheochromocytoma and hyperparathyroidism should be done at the age of 20. In MEN 2B, RET mutational analysis, calcitonin and neck USG should be done as soon as possible or less than 1 year age and screening for pheochromocytoma should be done at the age of 8 years.

107. A 34 year old male has history of resistant hypertension is diagnosed with pheochromocytoma. Further labs showed high calcium with low phosphate. What should be the most appropriate additional investigation to confirm the diagnosis?
A. PTH concentration
B. Fasting plasma Calcitonin
C. Pentagastrin stimulation test
D. Fasting gastrin level
E. Pituitary function tests

Ans: Pentagastrin stimulation test

Explanation: This patient has pheochromocytoma with hyperparathyroidism. To confirm the diagnosis of MEN 2A, pentagastrin stimulation test should be done as screening test for medullary carcinoma of thyroid. Calcitonin is used for monitoring of the recurrence of MTC after surgery.

108. Which of the following is the most common manifestation of MEN 1 syndrome?
A. Prolactinoma
B. Zollinger Ellison syndrome
C. Parathyroid hyperplasia
D. Insulinoma
E. Pheochromocytoma

100-300 ug
4

Ans: Parathyroid hyperplasia

Explanation: Hyperparathyroidism due to parathyroid hyperplasia is the most common manifestation of MEN 1 which eventually develops in more than 95% of patients. It is followed by pituitary adenomas (70%) and pancreatic neuroendocrine tumors (50%).

109. A 9 year old boy presented with early onset of pubic and axillary hair. His parents are worried about his premature adult look. You examined the child ~~and~~ revealed enlarged testis. His voice is also deepened. You ordered some tests which showed low FSH and low LH with high Urinary 17 OH progesterone. Which of the following should be the best treatment for him?
A. Cyproterone acetate
B. Flutamide
C. Prednisone

CAH - give time

D. Letrozole
E. Leuprolide

Ans: Prednisone

Explanation: Precocious puberty in a male patient with low LH and FSH suggests peripheral or pseudo Precocious puberty in this patient. The 1st step in the evaluation of precocious puberty is to differentiate between central and peripheral precocious puberty by the measurement of LH and FSH levels. In central precocious puberty these levels will be raised and in peripheral precocious puberty this level will be suppressed. In this patient, there are depressed LH and FSH, so the diagnosis is peripheral or pseudo Precocious puberty. 17 OH progesterone and DHEA sulphate should be measured next. 17 OH progesterone will be raised in CAH and DHEA sulphate will be raised in adrenal tumors. Peripheral precocious puberty is caused by McCune Albright syndrome, congenital adrenal hyperplasia and testotoxicosis. This patient is having high 17 OH progesterone which showed CAH as the cause. The treatment of CAH is physiological doses of glucocorticoids to suppress the overproduction of sex steroids. For central precocious puberty, GnRH analogue like leuprolide is used. Cyproterone acetate is used in the treatment of McCune Albright syndrome. Letrozole and flutamide are used in the treatment of testotoxicosis due to adrenal tumors.

110. A married couple came for your advice as they are trying to conceive for 3 years with no success. Male partner has a semen analysis done 3 days back which showed total sperm count of 3 million (normal > 39 millions). What should be the best next investigation for him?

A. LH and FSH ✓
B. Testosterone
C. Prolactin
D. Testicular ultrasound
E. Urinary 17 OH progesterone

100mg

Ans: LH and FSH

Explanation: In patients with low sperm count of less than 10 million, initial hormonal evaluation with FSH and LH should be done followed by testosterone and prolactin level. If LH, FSH are high it shows hypergonadotrophic hypogonadism and if low it will show hypogonadotropic hypogonadism. If hormonal evaluation is normal, scrotal ultrasound should be done to detect varicocele, testicular tumors and testicular microcalcifications. Transrectal USG is indicated in men with a low volume of ejaculate (< 1.5ml) to exclude obstruction of ejaculatory ducts.

111. A 52 year old type 2 diabetic on treatment presented with history of poor erection during sexual activity for 2 months. He is feeling depressed due to this. Further history suggests that he has nocturnal and early morning erection. What is the best initial management step for him?

A. Strict glycemic control
B. Sildenafil
C. Tadalafil
D. Psychiatric referral ✓
E. Phentolamine injection

Ans: Psychiatric referral

Explanation: Erectile dysfunction is defined as the inability to attain and/or maintain penile erection sufficient for satisfactory sexual performance. Men presenting with symptoms of ED should undergo a thorough medical, sexual, and psychosocial history; a physical examination; and selective laboratory testing. The presence of nocturnal and/or morning erections suggests a psychogenic component to ED symptoms that would benefit from further investigation and a referral to psychiatrist. Psychological factors (i.e., depression, anxiety, and relationship conflict) and psychosexual issues may be primary or secondary contributors to ED. Men may not appreciate that depression, anxiety, stress, and relationship conflicts can interfere with the physiological processes necessary for erectile function. Thoughtful discussion of these issues with men and their partners is a key component of patient education and can promote acceptance of incorporating a mental health/sexuality expert into the treatment plan. Involvement of a mental health expert with knowledge and experience to address issues of sexuality with men and their partners can benefit most patients and should be strongly considered when unresolved issues appear to be affecting the sexual relationship. In situations in which sudden or severe ED is likely to develop (e.g., men considering definitive therapy for pelvic cancers) or in cases with complex psychosocial issues (e.g., history of sexual trauma, long-term/lifelong sexual dysfunction), early inclusion of psychosexual expertise on the treatment team is critical to development of an effective and feasible treatment plan.

112. A 35 year old type 1 diabetic patient presented with history of poor erection and Inability to maintain erection. Further history suggests that he has no nocturnal and early morning erection. Serum testosterone is normal. What is the next best treatment step?

A. Good glycemic control
B. Psychiatric referral
C. Sildenafil
D. Erection improving devices
E. Paroxetine ✓

Bupro

SSRI/V

Ans: Sildenafil

Explanation: Diabetes mellitus increases the risk of erectile dysfunction. PDEi 5 are FDA approved drugs used for the treatment of erectile dysfunction.

113. A 46 year old male who is hypertensive, obese and having hyperlipidemia on multiple drugs presented with erectile dysfunction. Which of the following drugs is associated with erectile dysfunction?

A. Lisinopril
B. Atorvastatin
C. Amlodipine
D. Atenolol ✓
E. Indapamide

Ans: Atenolol

Explanation: Erectile dysfunction is a side effect of beta blockers.

114. A mother of 16 year old girl came to consult you regarding the absence of secondary sexual characters of her daughter. You noted short stature, enlarged clitoris with fused labia majora. Which of the following would be deficient in this patient?

A. 17 OH progesterone
B. Progesterone
C. Androstenedione
D. 11- deoxycortisol
E. Testosterone

CAH.
[illegible]
21 - 11β

Ans: 11- deoxycortisol

Explanation: This patient is having ambiguous external genitalia with enlarged clitoris, short stature and primary amenhorea which occurs in CAH. The most common cause is 21 hydroxylase deficiency. 21 hydroxylase enzyme converts 17- hydroxy progesterone into 11- deoxycortisol which is further converted into cortisol by 11- hydroxylase. In 21- hydroxylase deficiency, the level of 17 OH progesterone will be high and 11- deoxycortisol and cortisol will be low. The high 17 OH progesterone will divert to androstenedione and testosterone which will cause androgenization.

115. A 21 year old female presented in emergency with moderate colicky abdominal pain for 3 hours. Examination showed tachycardia and a blood pressure of 165/100 with normal abdominal examination. All the blood tests and imaging studies are normal. Patient has history of recurrent admissions in emergency with abdominal pain which lasts for 2-3 days. She is taking valproic acid for late onset epilepsy. What diagnosis should be considered in this patient?

A. Familial Mediterranean fever
B. Porphyria cutanea tarda
C. Acute intermittent porphyria
D. Pheochromocytoma
E. Irritable bowel syndrome

VPA

AIP
[illegible]

Ans: Acute intermittent porphyria ✓

Explanation: Acute intermittent porphyria (AIP) should be considered in the differential diagnosis of recurrent abdominal pain in young patient if there is no surgical cause of abdominal pain and if it is associated with neurological, psychiatric and autonomic signs and symptoms. Acute intermittent porphyria (AIP) is one of the porphyrias, a group of hereditary diseases that involve defects in heme metabolism and result in excessive secretion of porphyrins and porphyrin precursors. AIP is an autosomal dominant disease that results from defects in the enzyme porphobilinogen-deaminase. AIP manifests as episodes of abdominal pain, neuropathies, and constipation, but, unlike most types of porphyria, patients with AIP do not have a rash. The diagnosis of AIP can be confirmed by finding an elevated level of porphobilinogen (>6 mg/L) on a spot urine test during an acute attack. High doses of glucose can inhibit heme synthesis and are useful for treatment of mild attacks. Patients experiencing severe attacks, especially those with severe neurologic symptoms, should be treated with hematin. During attacks, which generally last for several days, patients require symptomatic treatment for pain and other manifestations.